Department of Planning, Housing and Infrastructure

Our ref: SSD-10290-PA-45

Simon Collins
Project Director
Department of Education
C/o School Infrastructure NSW
Level 8, 259 George Street
SYDNEY, NSW 2000

Attn: Kendal Caynes (Kendal.caynes1@det.nsw.edu.au)

29/01/2024

Bankstown North Public School (SSD-10290)
Out of Hours Event Management Plan (School and Community Use), Conditions E1 and E3

Dear Mr Collins

I refer to your Out of Hours Event Management Plan (OHEMP) for School and Community Use submitted to the Planning Secretary under conditions E1 and E3 of SSD-10290. I also acknowledge and thank you for your response to the request for additional information.

I note the OHEMP:

- has been reviewed by the Applicant, and no issues have been raised to the Department;
- has been prepared in consultation with Council; and
- includes the information required by conditions E1 and E3.

Accordingly, the Department has filed the Out of Hours Event Management Plan, Version 4.0 dated 18 January 2024, prepared by SCT Consulting Pty Ltd, for our information under conditions E1 and E3 of SSD-10290.

I remind you to comply with all operational restrictions in accordance with conditions E1 and E3 of the consent.

Please note that if there are any inconsistencies between the submitted OHEMP and the conditions of consent, the conditions will prevail.

Also, please make the OHEMP available for public access on the project website as per condition A23.

If you have any questions, please contact Jeremy Martin at jeremy.martin@dpie.nsw.gov.au.

Yours sincerely

Matthew Wood
Acting Team Leader - Social Projects
Infrastructure Management

As nominee of the Planning Secretary

Project:	Bankstown North Public School (SSD-10290)
Document:	Out of Hours Event Management Plan (OHEMP) (PA-45)
Date received from the Applicant:	18 December 2023 (initially received on 14 August 2023 and rejected on 22 August 2023)
Date comments sent by DPE:	8 January 2024
Date response received from the Applicant:	

No.	Condition	Requirement	Document Reference	DPE comment 8 January 2024	Project Team Response	Amendment made Y/N?	Page/ Section number	DPE assessment date	STATUS
1	**E1**	Prior to the commencement of the first out of hours events (School Use) run by the school that involve 100 or more people, the Applicant must prepare an Out of Hours Event Management Plan (School Use) in consultation with Council's Recreation and Community Facilities and Traffic Units and submit it to Council and the Planning Secretary for information. The plan must include the following:	Bankstown North Public School Out of Hours Event Management Plan, Version 3, dated 8 August 2023, prepared by SCT Consulting	Submitted 18 December 2023 (initially submitted and rejected in August 2023). Submitted **after** the commencement of the first out of hours events (School Use) run by the school that involve 100 or more people. Table 2-1 of the OHEMP demonstrates out-of-hours (OOH) events with more than 100 people throughout 2023, prior to submission of the OHEMP. DPE notes the following statement with the submission - *'The Department of Education advises that the Out of Hours Event Management Plan (OHEMP) as identified in Condition E1 and E3 was completed before the commencement of any out of hours events (School or Community Use) and that the OHEMP will be implemented by DoE for the duration of the events or use.'* The revision history of the OHEMP demonstrates a draft (Version 1) completed on 5 May 2023, although Table 2-1 also demonstrates events earlier in the school year. Consultation record (email chain) with Council submitted – no outstanding issues upon initial review. Updated OHEMP sent to Council (although not requested) and clarification of updates provided upon Council request. While no further response from Council has been provided, DPE is satisfied that consultation has occurred as per the condition. **DPE comment:** 1. Please detail why the OHEMP has been submitted after the	The Department of Education advises that the BNPS (the school) is an existing operational school and has held out of school hours (school use) events with more than 100 people prior to this project (SSD10290) commencing and prior to receiving the SSD conditions. With this in mind, a non-compliance notification was not submitted as these out of hours events have already been occurring prior to the submission of the SSDA for the school upgrade. The upgrade is only targeted at enabling additional student capacity growth which does not alter any operations of the out of hours events. As the nature of these out of hours events have not changed and no significant impact is expected. As described in section 4, a majority of school events occur during school hours with set up and pack down potentially spilling outside of school hours. As additional attendees of school events are mostly family members, vehicular traffic generated will be very similar to regular day traffic due to event start times coinciding with the start or end of the school day. In addition, category 2 events (>100 additional attendees) are low occurring events. External events still have less than 100 attendees and is not expected to change with the upgrade.	N	-		**OPEN**

No.	Condition	Requirement	Document Reference	DPE comment 8 January 2024	Project Team Response	Amendment made Y/N?	Page/ Section number	DPE assessment date	STATUS
				commencement of (applicable) OOH events. Has a non-compliance notification been submitted to the Department?					
	a)	the number of attendees, time and duration;		Addressed in Table 2-1. **No further comment.**	N/A	-	-	N/A	**CLOSED**
	b)	arrival and departure times and modes of transport		Not addressed in the OHEMP. DPE notes that Council did not raise any concerns upon review of the OHEMP. However, this detail is required. **DPE comment:** 2. Please update the OHEMP to provide the relevant detail, as per the condition.	Updated Table2-2 with mode of transport. Time of events are provided in Table 2-1 and arrival/departure times are estimated within the hour of the event time.	Y	Section 2, pg 8-10		**OPEN**
	c)	where relevant, a schedule of all annual events;		Addressed in Table 2-1. **No further comment.**	N/A	-	-	N/A	**CLOSED**
	d)	measures to encourage non-vehicular travel to the school and promote and support the use of alternate travel modes (i.e. public transport);		Addressed in Section 4.2. TAG (Appendix A) to be circulated to attendees. **No further comment.**	N/A	-	-	N/A	**CLOSED**
	e)	details of which parts of the school site (i.e. hall, sports courts, auditorium) would be used by the community, where applicable, restricting use before 8am and after 10pm;		Details of relevant parts of the school site addressed in Table 2-1. There is no specific statement acknowledging the restriction before 8am and after 10pm. **DPE comment:** 3. Please update the OHEMP to clearly demonstrate a commitment to the time restriction, as per the condition.	Updated section 2 to state that 'no event is allowed to occur before 8am and after 10pm'.	Y	Section 2, page 8		**OPEN**
	f)	measures to minimise localised traffic and parking impacts; and		Addressed in Section 3 and Section 4. Page 12 - *'…the previous traffic impact assessment assessed the impact of school traffic during peak periods – the worst performing traffic conditions*	N/A	-	-	N/A	**CLOSED**

No.	Condition	Requirement	Document Reference	DPE comment 8 January 2024	Project Team Response	Amendment made Y/N?	Page/ Section number	DPE assessment date	STATUS
				(Appendix C). Additional traffic outside of these hours would have a lesser impact on the road network and extensive traffic management is not necessary.' DPE notes the SSD-10290 Assessment Report (Page 37) states '*…there would be potential to agree to outside of school hours users accessing the staff car park. These arrangements would be subject to agreement with the Department of Education and external groups on a case-by-case basis…Council raised no further concerns regarding out of school hours parking in its comments on the RtS.*' No concerns raised by Council upon review of the OHEMP. **No further comment.**					
	g)	include measures to minimise noise impacts on any sensitive residential receivers, including the preparation of acoustic management plan.	Outside of Hours School Use Acoustic Management Plan, Revision 0 dated 19 October 2023 prepared by Acoustic Logic	While no measures are identified in the OHEMP, an acoustic management plan has been submitted. **No further comment.**	N/A	-	-	N/A	**CLOSED**
	E3	Prior to the commencement of out of hours events (Community Use) run by the external parties that involve 100 or more people, the Applicant must prepare an Out of Hours Event Management Plan (Community Use) in consultation with Council Council's Recreation and Community Facilities and Traffic Units and submit it to Council and the Planning Secretary for information. The plan must include the following:		Submitted 18 December 2023 (initially submitted and rejected in August 2023). Table 2-1 demonstrates that all community use OOH events will have **less than 50 people.** Therefore, no community use events that involve 100 or more people have occurred to date. Consultation record (email chain) with Council submitted – no outstanding issues upon initial review. Updated OHEMP sent to Council (although not requested) and clarification of updates provided upon Council request. While no further response from Council has been provided, DPE is satisfied that consultation has occurred as per the condition.	The same events are anticipated in 2024 (<50 people). No additional consultation with Council.	Y	Section 2, pg 8		**OPEN**

No.	Condition	Requirement	Document Reference	DPE comment 8 January 2024	Project Team Response	Amendment made Y/N?	Page/ Section number	DPE assessment date	STATUS
				DPE comment: 4. Are there any anticipated OOH events (community use) with more than 100 attendees in 2024? If yes, please provide further detail/consultation with Council (if any).					
	a)	the number of attendees, time and duration;		Addressed in Table 2-1. **No further comment.**	N/A	-	-	N/A	**CLOSED**
	b)	arrival and departure times and modes of transport;		Not addressed in the OHEMP. DPE notes that Council did not raise any concerns upon review of the OHEMP. However, this detail is required. A consolidated OHEMP has been submitted and the requirements of this condition will be addressed as per DPE comment #2 above. **No further comment.**	N/A	-	-	N/A	**CLOSED**
	c)	where relevant, a schedule of all annual events;		Addressed in Table 2-1. **No further comment.**	N/A	-	-	N/A	**CLOSED**
	d)	measures to encourage non-vehicular travel to the school and promote and support the use of alternate travel modes (i.e. public transport);		Addressed in Section 4.2. TAG (Appendix A) to be circulated to attendees. **No further comment.**	N/A	-	-	N/A	**CLOSED**
	e)	details of which parts of the school site (i.e. hall, sports courts, auditorium) would be used by the community, where applicable, restricting use before 8am and after 10pm;		Details of relevant parts of the school site addressed in Table 2-1. There is no specific statement acknowledging the restriction before 8am and after 10pm. A consolidated OHEMP has been submitted and the requirements of this condition will be addressed as per DPE comment #3 above. **No further comment.**	N/A	-	-	N/A	**CLOSED**

No.	Condition	Requirement	Document Reference	DPE comment 8 January 2024	Project Team Response	Amendment made Y/N?	Page/ Section number	DPE assessment date	STATUS
	f)	measures to minimise localised traffic and parking impacts and details on whether access to school carpark is permitted by community members; and		Addressed in Section 3 and Section 4. Page 12 - *'…the previous traffic impact assessment assessed the impact of school traffic during peak periods – the worst performing traffic conditions (Appendix C). Additional traffic outside of these hours would have a lesser impact on the road network and extensive traffic management is not necessary.'* DPE notes the SSD-10290 Assessment Report (Page 37) states '*…there would be potential to agree to outside of school hours users accessing the staff car park. These arrangements would be subject to agreement with the Department of Education and external groups on a case-by-case basis…Council raised no further concerns regarding out of school hours parking in its comments on the RtS.'* No concerns raised by Council upon review of the OHEMP. **No further comment.**	N/A	-	-	N/A	**CLOSED**
	g)	measures to minimise noise impacts on any sensitive residential receivers, including the preparation of acoustic management plan.	Outside of Hours Community Use Acoustic Management Plan, Revision 0 dated 12 October 2023 prepared by Acoustic Logic	While no measures are identified in the OHEMP, an acoustic management plan has been submitted. **No further comment.**	N/A	-	-	N/A	**CLOSED**

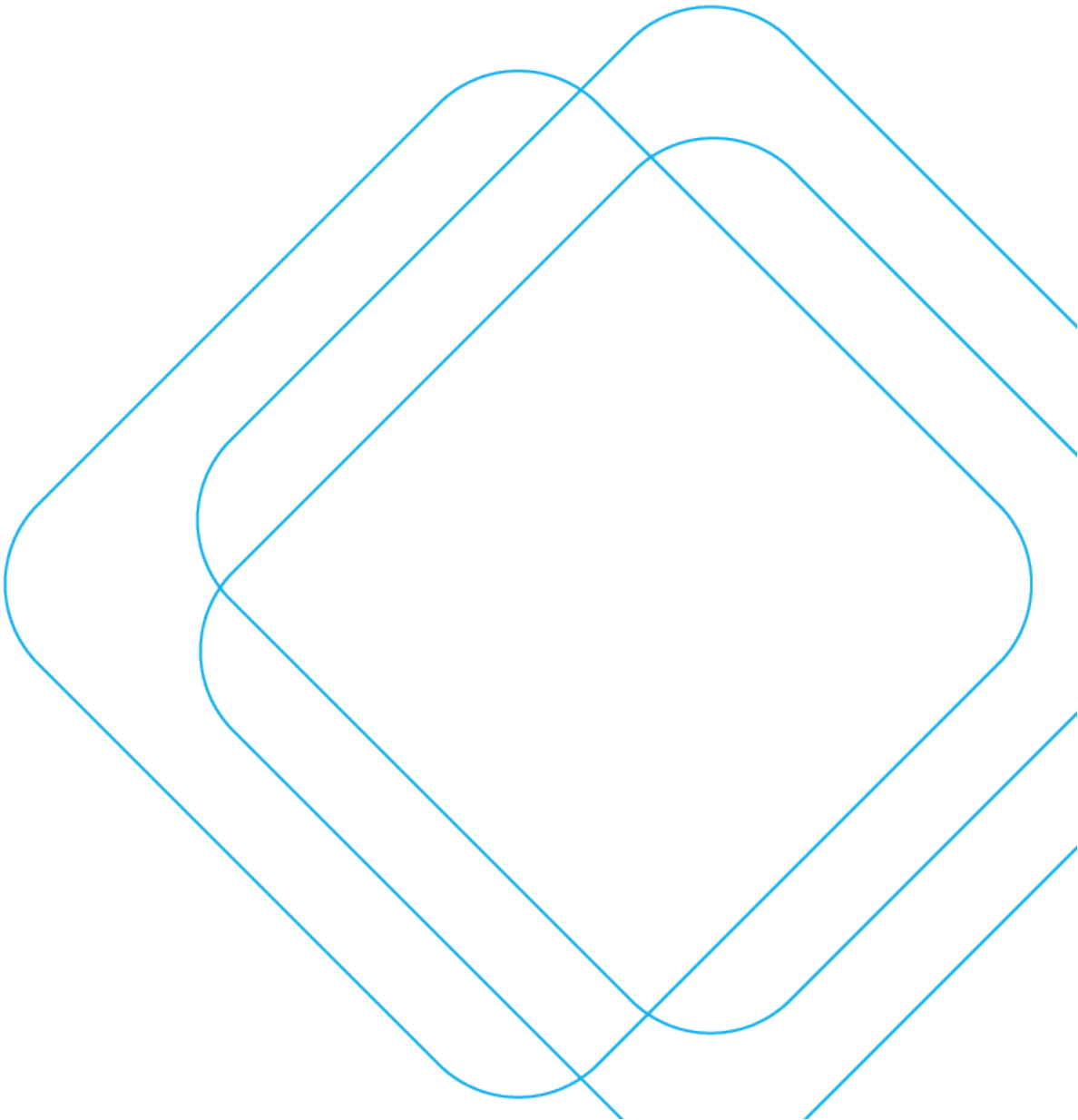
SCT Consulting

BANKSTOWN NORTH PUBLIC SCHOOL OUT OF HOURS EVENT MANAGEMENT PLAN

School and Community Use

18 JANUARY 2024

SCT Consulting acknowledges the traditional owners of the lands on which we work.
We pay our respects to Elders past, present and emerging.



Quality Assurance

Project:	Bankstown North Public School Out of Hours Event Management Plan		
Project Number:	SCT_00319		
Client:	School Infrastructure NSW	**ABN:**	40 300 173 822
Prepared by:	SCT Consulting PTY. LTD. (SCT Consulting)	**ABN:**	53 612 624 058

Information	Name	Position	Signature
Author:	Qian Lee	Senior Consultant	
Reviewer:	Jonathan Busch	Associate Director	
Authoriser:	Jonathan Busch	Associate Director	

Version	Date	Details
1.0	5 May 2023	Draft report
2.0	2 Aug 2023	Changes based on feedback from SINSW planning
3.0	8 Aug 2023	Minor text edit for consistency with conditions of consent
4.0	18 Jan 2024	Response to DPHI comments

Contents

Appendices

Executive Summary

Bankstown North Public School (BNPS) is currently undergoing redevelopment. This document is an out of hours event management plan prepared for Bankstown North Public School (BNPS) to address the Conditions of Consent E1 and E3 that were attached to the development approval. Condition E1 relates to school use events while condition E3 related to community use events.

Table ES 1-1 summarises the list of known events that will be hosted in the school compound in 2023 and is generally reflective of the typical events that occur in a year at the school. This list is not exhaustive and is only what is known to BNPS in the first quarter of 2023.

Table ES 1-1 List of 2023 events at BNPS

Category	Description	Event
Category 1 (School use)	School events that are not part of the usual curriculum	Anzac Day Ceremony Wednesday
		Easter Celebrations Hat Parade / Activities
		Education Week
		Gymnastics Programme
		Jump rope for Heart
		School Photos
		Scripture Classes
		Remembrance Day
		Drumbeat
		Assembly
		Cross Country
		Kindergarten Orientation
		Year 6 Farewell
		Prac Students (University)
Category 2 (School use)	School events that invite students' families	Parent Teacher Interviews
		Parent BBQ
		Presentation Day Assembly
		Tell them from me survey
		Year 6 Graduation
		Grandparents Day
Category 3 (Community use)	Events held by external parties that are non-school events	Pre Uni
		Sydney Siong Church
		CLS Tutoring
		Zumba Fitness

The events have been grouped into three categories:

– **Category One:** (School use) School events that are not part of the usual curriculum. In addition to students and staff, a maximum of 10 vendors or additional attendees will attend.

– **Category Two:** (School use) School events that invite students' families. In addition to students and staff, a maximum of 100 extra attendees (family members) will attend.

– **Category Three:** (Community use) Events held by external parties that are non-school events. These are less than 100 attendees and are held on weekends and non-school hours on weekdays.

Category three events or community use events are smaller than 100 people. Category one and two events (school use) typically involve all students and staff, with Category two events involving a larger group of additional attendees. School events typically occur on a school day with staff and students commuting via their usual travel mode.

The 10 additional event attendees for Category One events will have very minor traffic impacts. As Category two events usually occur at the start or end of the school day, family members attending the events would arrive at the event around school pick-up or drop-off time and hence no additional traffic is expected to be generated by these family members. Although parking will need to be managed, the day-to-day traffic management during school pick up and drop off is sufficient to manage event day traffic flows.

The conditions of consent note that separate out of hours event management plans are required for school and community use before the first of each event type at BNPS larger than 100 attendees. As BNPS has an enrolment of 324 students, any event involving all students would breach the 100-attendee threshold. BNPS also hosts community events that are smaller (less than 100 attendees). The event management plan for community and school use are combined despite the differently sized events as very similar recommendations were made for both types of events. Similar recommendations were made as school events typically occur during a school day and the previous traffic impact assessment has assessed that typical school traffic can be accommodated during the worst-performing peak hours. Any additional traffic arising from events do not occur often and are at a similar scale to smaller-scale community events. It is not practical to implement extensive mitigations to address these events.

Examples of general recommendations are:

– Circulation of Travel Access Guide (TAG).

– Potential access to BNPS carpark for additional attendees (if capacities allow).

– Circulation of event information and measures taken to manage traffic before the event. For example, there will be kiss 'n drop road management after the event, and sustainable travel messages that encourage parents to use public or active transport modes to school will be communicated.

Satisfaction of conditions of consent

Table ES 1-2 summarises the relevant conditions of consent and how they have been addressed by this out of hours event management plan. This report addresses both condition E1 out of hours events (School Use) and E3 out of hours events (Community Use).

Table ES 1-2 Satisfaction of conditions of consent

Conditions of consent	Response	Status
E1. Prior to the commencement of the first out of hours events (School Use) run by the school that involve 100 or more people, the Applicant must prepare an Out of Hours Event Management Plan (School Use) in consultation with Council's Recreation and Community Facilities and Traffic Units and submit it to Council and the Planning Secretary for information. The plan must include the following: **(a)** the number of attendees, time and duration; **(b)** arrival and departure times and modes of transport; **(c)** where relevant, a schedule of all annual events; **(d)** measures to encourage non-vehicular travel to the school and promote and support the use of alternate travel modes (i.e. public transport); **(e)** details of which parts of the school site (i.e. hall, sports courts, auditorium) would be used by the community, where applicable, restricting use before 8am and after 10pm; **(f)** measures to minimise localised traffic and parking impacts; and **(g)** include measures to minimise noise impacts on any sensitive residential receivers, including the preparation of acoustic management plan.	**Section 2.0** summarises the details of anticipated school use events in 2023 at BNPS. Those events are reflective of the general school use events that occur in a year at BNPS and includes detail on: **(a)** estimated number of attendees, time and duration; **(b)** arrival and departure times and modes of transport; **(c)** a known schedule of all annual events; and **(e)** details of which parts of the school site (i.e. hall, sports courts, auditorium) would be used by the community, where applicable, restricting use before 8am and after 10pm. These events have been grouped into three categories with recommendations in **Section 4.0**: **(d)** measures to encourage non-vehicular travel to the school and promote and support the use of alternate travel modes (i.e. public transport); and **(f)** to minimise localised traffic and parking impacts.	This report satisfies E1 conditions **(a)** to **(f)**. An acoustic management plan will need to be separately undertaken to fully satisfy condition E1.
E2. The Out of Hours Event Management Plan (School Use) must be implemented by the Applicant for the duration of the identified events or use.	The plan includes provisions for school use events and community use events. The final plan shall be implemented by BNPS.	Draft plan has been issued to SINSW, Council and BNPS for comment. Council and BNPS have no further comments. The final plan shall be submitted to DPE for information and implemented by BNPS.
E3. Prior to the commencement of out of hours events (Community Use) run by the external parties that involve 100 or more people, the Applicant must prepare an Out of Hours Event Management Plan (Community Use) in consultation with Council Council's Recreation and Community Facilities and Traffic Units and submit it to Council and the Planning Secretary for information. The plan must include the following:	**Section 2.0** summarises the details of anticipated school use events in 2023 at BNPS. Those events are reflective of the general school use events that occur in a year at BNPS and includes detail on: **(a)** estimated number of attendees, time and duration; **(b)** arrival and departure times and modes of transport;	This report satisfies E3 conditions **(a)** to **(f)**. An acoustic management plan will need to be separately undertaken to fully satisfy condition E1.

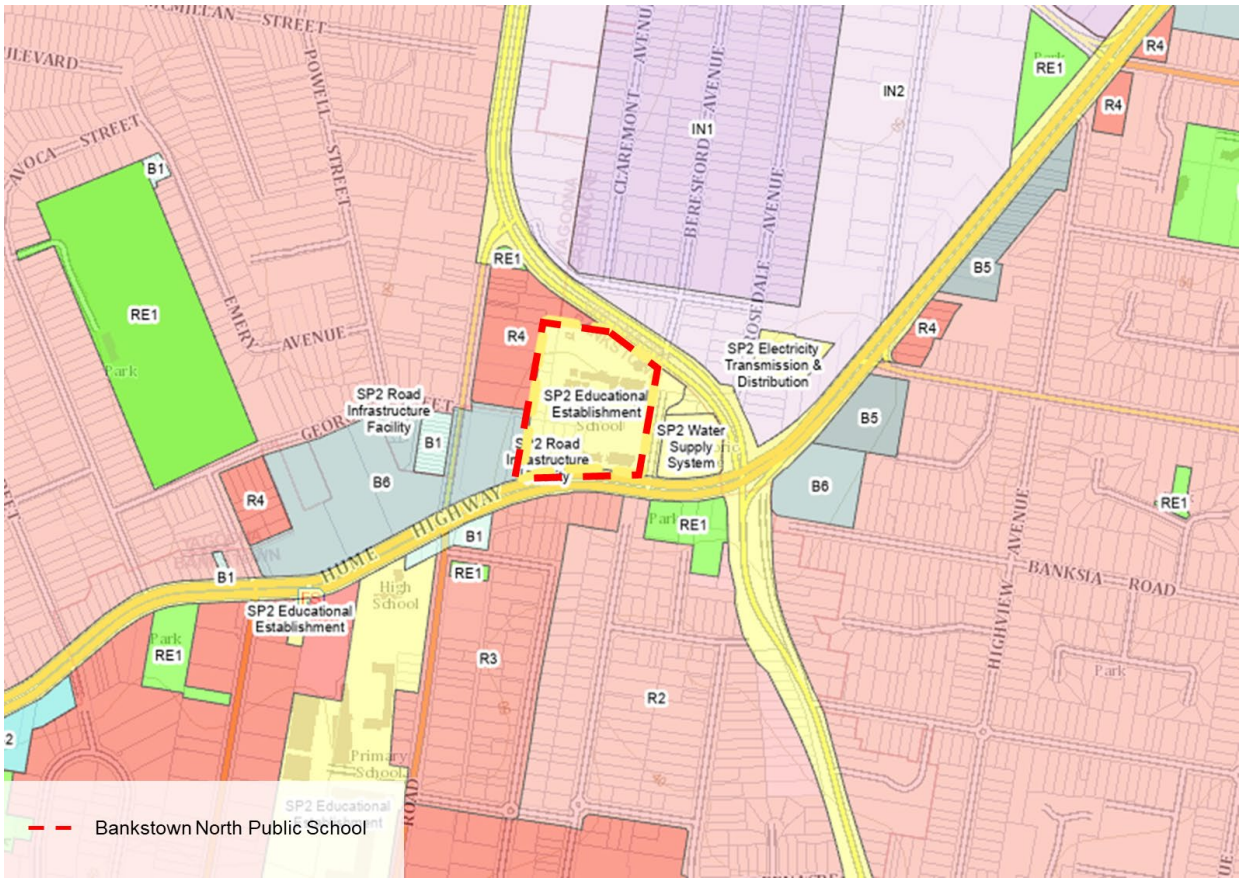
Conditions of consent	Response	Status
a. the number of attendees, time and duration; b. arrival and departure times and modes of transport; c. where relevant, a schedule of all annual events; d. measures to encourage non-vehicular travel to the school and promote and support the use of alternate travel modes (i.e. public transport); e. details of which parts of the school site (i.e. hall, sports courts, auditorium) would be used by the community, where applicable, restricting use before 8am and after 10pm; f. measures to minimise localised traffic and parking impacts and details on whether access to school carpark is permitted by community members; and g. measures to minimise noise impacts on any sensitive residential receivers, including the preparation of acoustic management plan.	**(c)** a known schedule of all annual events; and **(e)** details of which parts of the school site (i.e. hall, sports courts, auditorium) would be used by the community, where applicable, restricting use before 8am and after 10pm. These events have been grouped into three categories with recommendations in **Section 4.0**: **(d)** measures to encourage non-vehicular travel to the school and promote and support the use of alternate travel modes (i.e. public transport); and **(f)** to minimise localised traffic and parking impacts.	
E4. The Out of Hours Event Management Plan (Community Use) must be implemented by the Applicant for the duration of the identified community event or use.	The plan includes provisions for school use events and community use events. The final plan shall be implemented by BNPS.	Draft plan has been issued to SINSW, Council and BNPS for comment. Council and BNPS have no further comments. The final plan shall be submitted to DPE for information and implemented by BNPS.

1.0 Introduction

1.1 Background

Bankstown North Public School (BNPS) is located within the City of Canterbury Bankstown Local Government Area (LGA). It has 324 students from kindergarten to year six. It is surrounded by predominantly residential dwellings (low and medium density as shown in **Figure 1-1**) and is approximately 32 kilometres from the Sydney Central Business District (CBD).

Figure 1-1 Land use zoning surrounding Bankstown North Public School



Source: NSW Department of Planning and Environment, NSW Planning Portal

BNPS is bordered by the Hume Highway to the south and Rookwood Road to the northeast of the campus. Hume Highway is a primary transport corridor in the area with several commercial-zoned uses located on either side of the roadway close to BNPS. Pedestrian access to the school is on Hume Highway, Beresford Avenue, and Davis Lane (**Figure 1-2**). The closest train station is Bankstown Station which is approximately 1.6 kilometres from the school.

Figure 1-2 Pedestrian access

Source: Nearmap 2023

1.2 Purpose

This document is an out of hours event management plan prepared for BNPS to address the Conditions of Consent E1 and E3 that were attached to the development approval for the school redevelopment. This plan excludes any assessment and management of acoustics at these events. The conditions are summarised below:

– **E1.** Prior to the commencement of the first out of hours events (School Use) run by the school that involve 100 or more people, the Applicant must prepare an Out of Hours Event Management Plan (School Use) in consultation with Council's Recreation and Community Facilities and Traffic Units and submit it to Council and the Planning Secretary for information. The plan must include the following:

  a. the number of attendees, time and duration;

  b. arrival and departure times and modes of transport;

  c. where relevant, a schedule of all annual events;

  d. measures to encourage non-vehicular travel to the school and promote and support the use of alternate travel modes (i.e. public transport);

  e. details of which parts of the school site (i.e. hall, sports courts, auditorium) would be used by the community, where applicable, restricting use before 8am and after 10pm;

  f. measures to minimise localised traffic and parking impacts; and

  g. include measures to minimise noise impacts on any sensitive residential receivers, including the preparation of acoustic management plan.

- **E2.** The Out of Hours Event Management Plan (School Use) must be implemented by the Applicant for the duration of the identified events or use.
- **E3.** Prior to the commencement of out of hours events (Community Use) run by the external parties that involve 100 or more people, the Applicant must prepare an Out of Hours Event Management Plan (Community Use) in consultation with Council Council's Recreation and Community Facilities and Traffic Units and submit it to Council and the Planning Secretary for information. The plan must include the following:
    a. the number of attendees, time and duration;
    b. arrival and departure times and modes of transport;
    c. where relevant, a schedule of all annual events;
    d. measures to encourage non-vehicular travel to the school and promote and support the use of alternate travel modes (i.e. public transport);
    e. details of which parts of the school site (i.e. hall, sports courts, auditorium) would be used by the community, where applicable, restricting use before 8am and after 10pm;
    f. measures to minimise localised traffic and parking impacts and details on whether access to school carpark is permitted by community members; and
    g. measures to minimise noise impacts on any sensitive residential receivers, including the preparation of acoustic management plan.
- **E4.** The Out of Hours Event Management Plan (Community Use) must be implemented by the Applicant for the duration of the identified community event or use.

The conditions of consent note that separate out of hours event management plans are required for school and community use before the first of each event type at BNPS larger than 100 attendees. As BNPS has an enrolment of 324 students, any event involving all students would breach the 100-attendee threshold (further details on events in **Section 2.0**). BNPS also hosts community events that are smaller (less than 100 attendees). The event management plan for community and school use are combined despite the differently sized events as very similar recommendations (in **Section 4.0**) were made for both types of events. Similar recommendations were made as school events typically occur during a school day and the previous traffic impact assessment has assessed that typical school traffic can be accommodated during the worst-performing peak hours. Any additional traffic arising from events do not occur often and are at a similar scale to smaller-scale community events. It is not practical to implement extensive mitigations to address these events.

2.0 Potential schedule

BNPS has provided a list of known events in 2023 that will be held in BNPS, which are inclusive of school and community uses. This is not an exhaustive list as there may be additional events during the year. However, the list is reflective of typical annual events that occur at the school. The same events are expected in 2024. These events can be generally categorised into three categories as summarised in **Table 2-1**.

Generally, community use events are less than 100 attendees with school use events typically involving all students, staff, potential vendors, and family members. Most school events will occur during a school day of 9 am to 3 pm while community events are typically held during the weekends or after 3.00 pm on the weekdays. No event is allowed to occur before 8am and after 10pm.

While there are school events occurring during school hours, event set up or wrap up may extend into out of hour time periods and these events are included in **Table 2-1**. All attendees and event set up or wrap up are expected to arrive and depart within an hour of the start or end of the event. The school is accessible via active and public transport but a majority of attendees are likely to drive, especially family members attending school events. Estimated mode shares for each event type are identified in **Table 2-2**.

Depending on the type of event (involving loud music, food stalls, etc), certain event and permit requirements may need to be obtained from City of Canterbury Bankstown.

Table 2-1 Summary of 2023 events

Category	Description	Event	Time (if known)			Date	Proposed location	Estimated attendees
			Event time	Bump in	Bump out			
Category 1 (School use)	School events that are not part of the usual curriculum	Anzac Day Ceremony Wednesday	9:15 am - 3:00 pm	8:15 am	4:00 pm	05/04/23	School hall Assembly court School field	Typically whole student cohort (324 current students) and staff. A maximum of 10 additional facilitators, vendors, or external attendees.
		Easter Celebrations Hat Parade / Activities	9:00 am - 3:00 pm	8:00 am	4:00 pm	06/04/23		
		Education Week	9:00 am – 3:00 pm	8:00 am	4:00 pm	04/08/23		
		Gymnastics Programme	9:00 am - 3:00 pm	8:00 am	4:00 pm	Term 3		
		Jump rope for Heart	9:00 am - 3:00 pm	8:00 am	4:00 pm	Term 4		
		School Photos	9:00 am - 3:00 pm	8:00 am	4:00 pm	01/06/23		
		Scripture Classes	2:00 pm - 3:00 pm	1:00 pm	4:00 pm	Term 1 to 4		
		Remembrance Day				11/11/23		
		Drumbeat	2:00 pm - 3:00 pm	1:00 pm	4:00 pm	T1		
		Assembly				Term 1 to 4 fortnightly		
		Cross Country	9:00 am -12:00 pm	8:00 am	1:00 pm	Term 2		
		Kindergarten Orientation				Term 4 (3 to 4 day period)		
		Year 6 Farewell				15/12/23		
		Prac Students (University)				Term 2	Classroom Learning space	Maximum of 5 students
Category 2 (School use)	School events that invite students' families	Parent Teacher Interviews	9:30 am - 6:00 pm	8:30 am	7:00 pm	Term 1 Week 5	Classrooms Learning spaces School hall	Typically whole student cohort (324
		Parent BBQ	3:15 pm - 4:30 pm	2:15 pm	5:30 pm	Term 1 Week 3		

		Presentation Day Assembly				14/12/23		current students) and staff. Maximum 100 parents
		Tell them from me survey				Term 4		
		Year 6 Graduation				16/12/23		
		Grandparents Day				Term 4		
Category 3 (Community use)	Events held by external parties that are non-school events	Pre Uni	8:30 am - 3:00 pm	7:30 am	4:00 pm	Thursday and Saturday (weekly)	School hall Assembly court School field	Less than 50 people
		Sydney Siong Church				Sunday (weekly)		
		CLS Tutoring	9:00 am - 3:00 pm	8:00 am	4:00 pm	Saturday (weekly)		
		Zumba Fitness				Thursday (weekly)		

Table 2-2 Estimated mode share

Category	Event	Mode share				Discussion
		Walking	Cycling	Public Transport	Car	
Category 1 (School use)	Anzac Day Ceremony Wednesday Easter Celebrations Hat Parade / Activities Education Week Gymnastics Programme Jump rope for Heart School Photos Drumbeat Cross Country Scripture Classes Assembly Remembrance Day Kindergarten Orientation Year 6 Farewell Prac Students (University)	Students: 26% Additional vendors: 0%	Students: 0% Additional vendors: 0%	Students: 2% Additional vendors: 10%	Students: 72% Additional vendors: 90%	As these events are during school hours, students attending these events will travel to school in their usual travel mode (based on latest school travel survey). Additional vendors/facilitators are likely to drive as they are carrying equipment.
Category 2 (School use)	Parent Teacher Interviews Parent BBQ Presentation Day Assembly Tell them from me survey Year 6 Graduation Grandparents Day	Students: 26% Family: 2%%	Students: 0% Family: 0%	Students: 2% Family: 25%	Students: 72% Family: 72%	These events involve family members on a typical school day. Families will take time off-work as needed to attend these events. Typical journey-to work-mode shares are expected.

Category 3 (Community use)	Pre Uni	16%	0%	9%	75%	Events occur on the weekends or outside school hours. 2023 Household Travel Survey referenced to understand how people in the area travel. High car mode share expected as visitors can park on site (subject to approval for event) or in the surrounding local streets).
	Sydney Siong Church					
	CLS Tutoring					
	Zumba Fitness					

3.0 Existing conditions

These are the following transport facilities currently available:

– 56 parking spaces on site, one of which is disabled parking. Access to the carpark is via Beresford Avenue or Davis Lane. These are currently limited to staff use currently and other external visitors as approved by the school.

– The parking spaces will not sufficiently cater for non-staff attendees for Category 1 and 2 events (school use) as these events are typically held during school hours and car parking is already taken up by staff.

– There are footpaths on both sides of Hume Highway fronting the school and on the western side of Beresford Avenue. Onward pedestrian connectivity is limited on Davis Lane and Rookwood Avenue with discontinuous footpaths.

– The closest bus stops are within a 300m walk from the school. The stops fronting the school on Hume Highway service Burwood – Liverpool, Bankstown – Strathfield, and East Hills – Lidcombe. Higher frequency Metrobus services are on Rookwood Road and Chapel Road which service Hurstville – Parramatta and Sutherland – Parramatta. There are services that arrive 5 minutes apart on Hume Highway, Rookwood Road and Chapel Road that provide a connection to Bankstown train station.

– BNPS is committed to improving travel mode shares for sustainable travel modes. This includes investing in a new school bus route, developing a walking school bus route, and promoting active and public transport as choice travel modes for events.

These existing conditions have been considered in the development of the out of hours event management plan.

4.0 Recommendations

As summarised in **Table 2-1**, a year of typical events in BNPS can be classified into three categories:

– **Category 1** – school events held during a typical school day. These involve the usual staff and student cohort and a maximum of 10 additional non-school vendors, facilitators or attendees.

– **Category 2** – school events held during a typical school day that involves the usual staff and student cohort and a maximum of 100 family members.

– **Category 3** – external non-school events of less than 100 people.

The following sections will detail recommendations on the management of the different categories of events.

4.1 Category 1

Although Category 1 events are typically held during regular school hours, events can spill over or start outside of school hours. A majority of attendees are students and they are being picked up and dropped off at normal school hours using their regular mode of travel. Typical school-day traffic management will be sufficient to manage the students.

The impacts generated by the additional 10 non-school attendees, vendors, or facilitators are very minute. However, in line with BNPS's intentions to promote sustainable transport modes, a copy of the Travel Access Guide (TAG) will be provided to encourage active or public transport travel. A copy of the TAG that was prepared for the School Transport Plan is saved in **Appendix A**.

If driving to BNPS, the additional attendees may also request temporary access to the school carpark on the day of the event, if capacities allow. Approvals will be on a case-by-case basis by the school management.

4.2 Category 2

Although there will be additional attendees of up to 100 people, these attendees are BNPS students' family members and would already be involved in their child's daily pick-up and drop-off. Vehicular traffic generated by these events will be very similar to the typical school pick up and drop off as the event start times usually coincide with the start or end of the school day. However, family members who drive will have to find parking. There are no public car parks in the school and on-street parking on streets adjacent to BNPS is very limited as the school is located along major roadways. There are some on-street parking spaces on the local streets and Rookwood Road.

Although there will be some parking management required, Category 2 events occur on fewer than 10 days in a year. BNPS is not in a position to implement extensive traffic management measures for these events. These events currently occur and so the community around the school is already aware of their impacts.

Even if the event does not coincide with school pick up and drop off times, the previous traffic impact assessment assessed the impact of school traffic during peak periods – the worst performing traffic conditions (**Appendix C**). Additional traffic outside of these hours would have a lesser impact on the road network and extensive traffic management is not necessary.

It is recommended that the following measures be put in place:

– Circulation of the TAG (**Appendix A**) to attendees of Category 2 events to encourage sustainable travel modes.

– Before the event, the following information is circulated to all attendees:

  - Avoiding events that have more than 100 parents invited
  - Sustainable travel messages are included to reaffirm BNPS's position on sustainable travel modes in school communication channels (school website, newsletters and social media platforms like Facebook and Seesaw)
  - Communications about the lack of on-site parking and encouragement to allow time to park and walk through school communication channels
  - Teachers to manage kiss 'n drop road during event egress
  - Information on the closest off-street carpark at Yagoona Station or Bankstown Station commercial area (20 minute walk) as there is no on-site parking at BNPS

- If the attendees must drive, staggered arrivals are recommended (this is implemented currently for student-teacher interviews)
- An example of circulated information is in Appendix B.

The primary mitigation is currently in place – avoiding having events where all parents/guardians are invited and the school is in full attendance. Events of this scale would have significant impacts and should be planned for on a case-by-case basis.

4.3 Category 3

Category 3 events are typically held on the weekends or weekdays outside of school hours. Although no major traffic impacts are expected, it is recommended that the following measures are in place to manage the potential impacts:

– Circulate a copy of the TAG to inform attendees of alternative travel methods to BNPS

– Attendees may also request temporary access to the school carpark on the day of the event if capacities allow. This is more feasible on the weekends when no school staff are likely to use the carpark. Approvals will be on a case-by-case basis by the school management.

The traffic generated by these events is significantly less than generated on weekdays, and less than what was assessed in the SSDA traffic report.

4.4 Monitoring

The out of hours event management plan should be a point of reference whenever a Category 1 to 3 event occurs. The plan should be updated by the School Travel Coordinator or BNPS staff whenever new events are added to the list.

The plan should be monitored annually to understand whether the identified actions are still suitable to the types of events that are occurring on site.

APPENDIX A

TRAVEL ACCESS GUIDE

Bankstown North Public School

Travel Access Guide

08/03/2022

Project overview

Bankstown North Public School is undergoing a major upgrade to bring students the latest education facilities and support the growing local community.

Active ways to get to school

Walking is an active and healthy way to get to school

- Stop! Look! Listen! Think! every time you cross the road and keep checking until safely across.

Ride your bike

- Always wear a helmet when you ride your bike.
- Take special care at driveways where vehicles may be driving in or out.
- Ride your bike away from the roads.

Ride your scooter

- Always wear a helmet when you ride your scooter.
- Take special care at driveways where vehicles may be driving in or out.
- Ride your scooter away from the roads.

Kiss and drop expectations

- It's important we all model safe road user behaviour.
- When we're driving around schools, we need to remember that children don't always understand the road rules. Always take extra care in school zones.

Message from your Principal

- COVID-19 has had many significant changes for each of us. Now we're coming back to school I want to encourage all of you to return to school safely and think about active ways to get to school.
- Did you know that children who walk to school have been found to be more attentive and focused in class? Walking is also good for mental health.
- There are some great resources on the Department's website about safe travel to school: **https://education.nsw.gov.au/teaching-and-learning/curriculum/learning-across-the-curriculum/road-safety-education/**.
- Getting to school safely is everyone's responsibility. We all need to be taking extra care when we're driving around our school. Please make sure you don't call out to your children across the road - always cross at a safe place.

For more information contact:

School Infrastructure NSW
Email: schoolinfrastructure@det.nsw.edu.au
Phone: 1300 482 651
www.schoolinfrastructure.nsw.gov.au

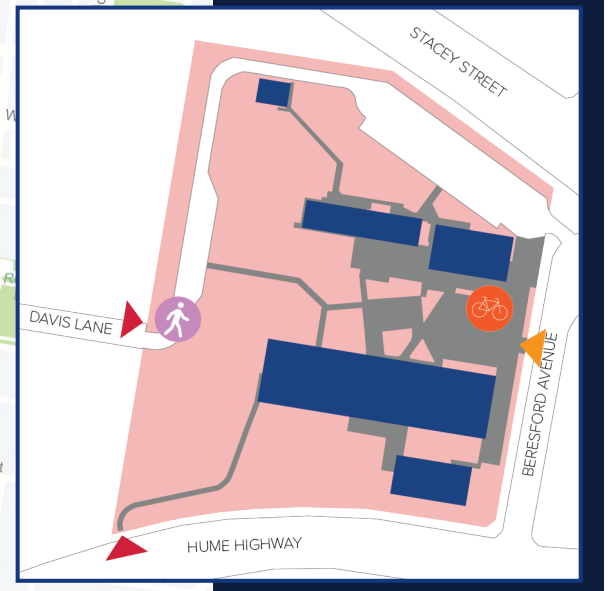
NSW GOVERNMENT

NSW Department of Education – School Infrastructure

Useful links

Bicycle nsw membership (insurance, discounts) and other resources: **https://bicyclensw.org.au/**. Use discount code tnswtag to receive 15% off.

You can find tips and resources for safe school travel at **https://www.safetytown.com.au/**.



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NSW GOVERNMENT

Bankstown North Public School

Travel Access Guide

08/03/2022

Project overview

Bankstown North Public School is undergoing a major upgrade to bring students the latest education facilities and support the growing local community.

Using public transport to get to school

School buses and public buses

- Routes 907, 908, 913, 925, M90, M91, M92 are available on Hume Highway.
- Always wait until the bus has gone, then use a safe place to cross.

- Plan ahead, allow plenty of travel time and slow down to avoid slips and falls.

Apply for a School Opal Card | School Term Bus Pass

- School Opal cards provides free school travel and can be used as a School Term Bus Pass, for travel within the Opal network. Visit **https://transportnsw.info/school-travel-apply** to see if you are eligible.
- Students are expected to be courteous and responsible, and follow the school student's code of conduct when travelling on public transport.

Message from your Principal

- COVID-19 has had many significant changes for each of us. Now we're coming back to school I want to encourage all of you to return to school safely.
- Transport for NSW is changing timetables, routes and other policies to keep students safer on public transport. Advice changes regularly, so stay up to date with the latest transport information at **https://transportnsw.info/covid-19/covid-19-safer-travel-guidance**.
- There are some great resources on the Department's website about safe travel to school: **https://education.nsw.gov.au/teaching-and-learning/curriculum/learning-across-the-curriculum/road-safety-education/**.
- Getting to school safely is everyone's responsibility. We all need to be taking extra care when we're driving around our school. Please make sure you don't call out to your children across the road - always cross at a safe place.

Kiss and drop code of conduct

- It's important we all model safe road user behaviour.
- When we're driving around schools, we need to remember that children don't always understand the road rules. Always take extra care in school zones.

For more information contact:

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www.schoolinfrastructure.nsw.gov.au

NSW GOVERNMENT

NSW Department of Education – School Infrastructure

Something broken on the way to school?

Use the Snap Send Solve app or website to report issues to the people who can fix them.

Things like abandoned trolleys, broken footpaths or water leaks can all be reported in the app.

Download it today from the App Store or Google Play. Or visit **www.snapsendsolve.com**.

Useful links

Trip planner (**https://transportnsw.info/trip**).

School Student Transport Scheme **https://apps.transport.nsw.gov.au/ssts/#/**.

For more information contact:

School Infrastructure NSW
Email: schoolinfrastructure@det.nsw.edu.au
Phone: 1300 482 651
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NSW GOVERNMENT

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NSW GOVERNMENT

APPENDIX B

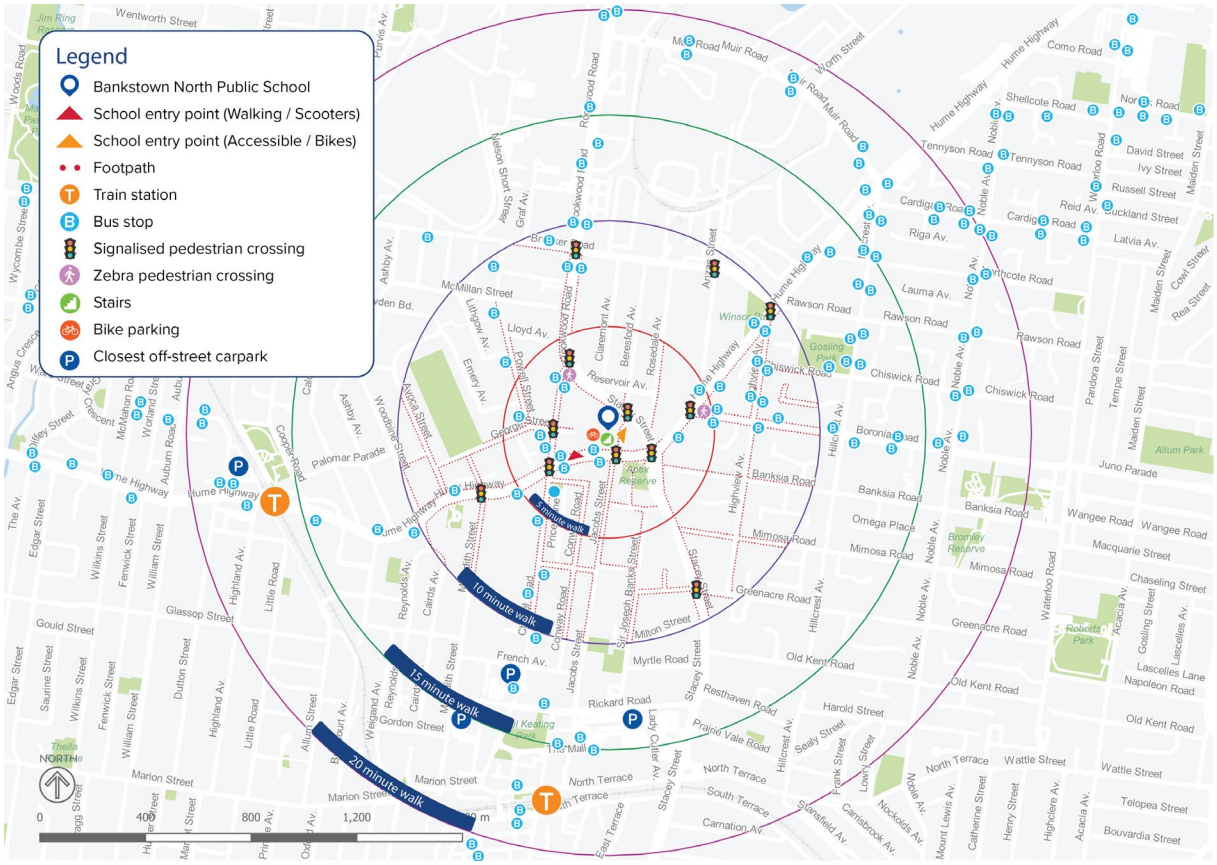
SAMPLE LETTER

Bankstown North Public School – Sample letter to event attendees

We are excited to have you at <EVENT NAME> on <DATE>. The Travel Access Guide has been attached to keep you informed of the potential travel options to school. Unfortunately, the school is located close to a very busy intersection with no on-site parking available for public access and very limited on-street parking.

As there will be many others travelling to the school to attend the event too, we would encourage you to opt to walk, cycle or take public transport to school to avoid the hassle of parking. The closest train station is Bankstown Station which is serviced by train lines T2 and T3. Bus services 925, M91 and M92 will take you to Bankstown North Public School.

If you must drive, the closest off-street carpark is located close to Yagoona Station or the commercial area close to Bankstown Station (see map below). It is a 20-minute walk to the school from these carparks.

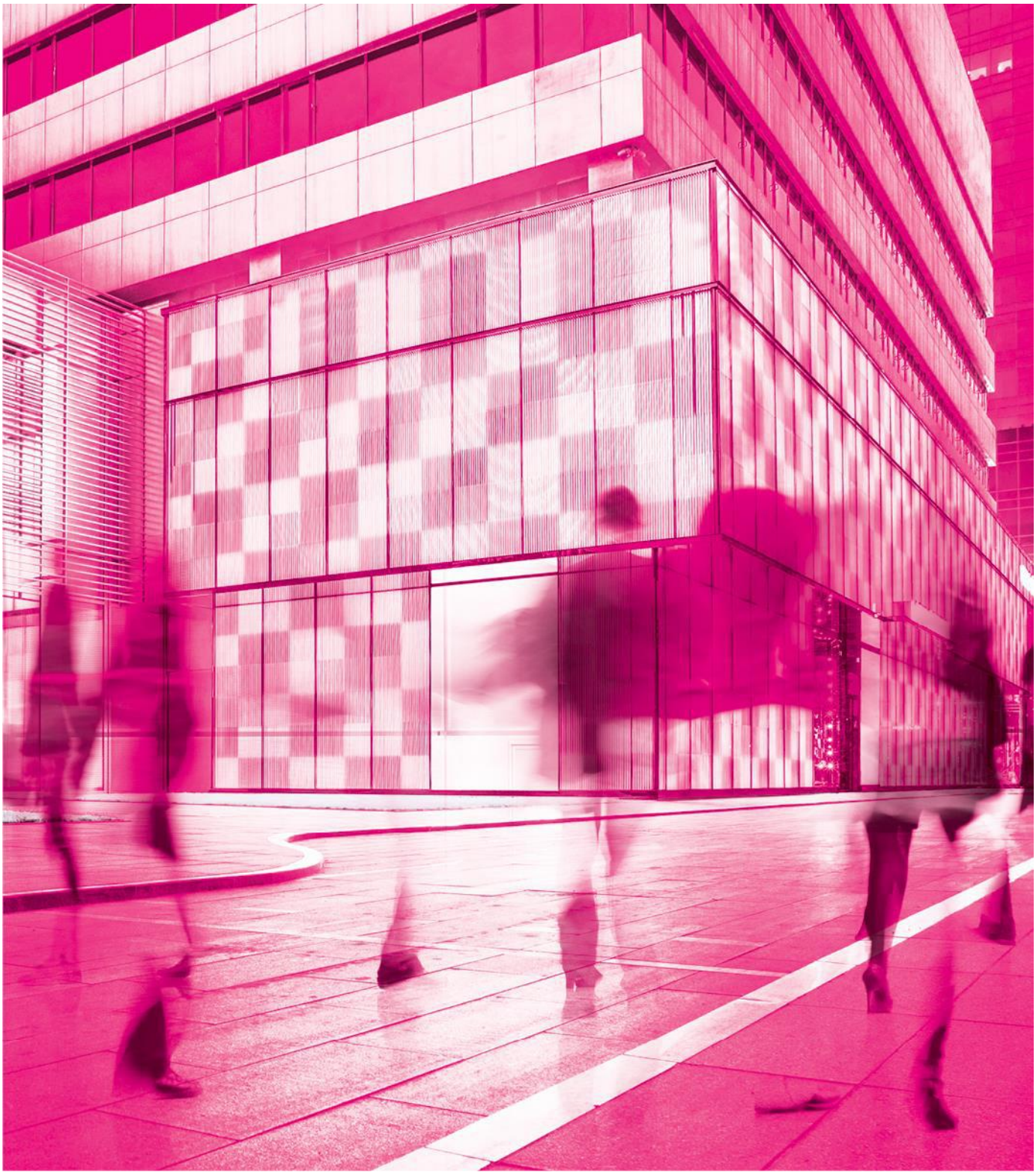


Did you know that more than 80% of the world's adolescent population is not active enough (WHO)?

Children between 5 to 17 years need several hours of light exercise a week – like walking! Walking can work wonders. It can help prevent heart disease, stroke, type 2 diabetes, and high blood pressure. It increases energy levels, strengthens your immune system, and improves mood. We could all benefit from more steps each day. If you typically drive, it would be a great activity to travel to school with your child.

APPENDIX C

PREVIOUS TRAFFIC IMPACT ASSESSMENT



traffic impact assessment;

Bankstown North Public School Redevelopment

For SINSW

30 September 2020

parking;
traffic;
civil design;
communication;

ptc.

Document Control

Bankstown North Public School Redevelopment, Traffic impact assessment

Issue	Date	Issue Details	Author	Reviewed	For the attention of
1	17/04/2020	Draft Issue	KB	AM	Giuseppe Lauriola
2	20/04/2020	Draft Issue R1	KB	AM	Giuseppe Lauriola
3	22/04/2020	Draft Issue R2	KB	AM	Giuseppe Lauriola
4	05/05/2020	Final Issue	KB	AM	Giuseppe Lauriola
5	13/07/2020	Revision 1	KB	AM	Simon Collins
6	24/07/2020	Revision 2 Draft	KB	AM	Simon Collins
7	30/07/2020	Revision 2	KB	AM	Simon Collins
8					

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Contents

1. Executive Summary

This report presents the transport, traffic and parking assessment associated with the proposal to redevelop the Bankstown North Public School, which will involve an increase in the student population to 644 students by 2026.

The key findings and information presented in this report are presented in the following points:

- The project comprises the reconstruction of the school and an increase in the population from the existing enrolment of 330 to 644 students gradually increasing following the completion of the project.
- The existing car park of 55 spaces will be demolished to make way for new buildings, while a parking provision of 56 spaces is proposed within a new car park located on the northern side of the property, which is compliant with the DCP requirement. Access to the car park will be from Beresford Avenue, located to the north of the current driveways.
- The proposed layout incorporates a new roadway to facilitate drop-off and pick-up activity within the property, which will pass along the northern and western boundaries, connecting with Davis Lane. The roadway will operate in a one-way westbound direction so that all parent vehicles will enter from Beresford Avenue and exit on to Davis Lane. The internal facility will remove all drop-off activity from Beresford Avenue and mostly accommodate the associated queue. As such, the proposed layout has been tacitly supported by TfNSW.
- Through discussions with TfNSW several changes to the road and pedestrian network have been highlighted, which are relevant in the assessment of this project:
    - The upgrade of the Stacey Street / Hume Highway intersection,
    - The prohibition of the right turn movement into and out of Beresford Avenue,
    - The potential traffic signals at Davis Lane / Rookwood Road,
    - A new pedestrian bridge over the Hume Highway connecting between Jacobs Street and Beresford Avenue,
    - The timing of the TfNSW road upgrades has not been determined yet; therefore, as an interim solution for the Hume Highway / Beresford Avenue intersection, the project is proposing to work with the authorities to implement a staggered pedestrian crossing with a holding area at the median of the Hume Highway.
- Each of these improvements has been incorporated within our analysis including the available traffic distribution routes to/from the school.
- The traffic assessment has concluded that the projected activity associated with the maximum student population is able to be incorporated within the road network. It should be noted that the current transport mode share has been adopted to determine the projected traffic activity, however initiatives presented within the Green Travel Plan (prepared for this submission), will likely reduce the overall traffic activity.

2. Introduction

2.1 Background

ptc. has been engaged by Schools Infrastructure NSW (SINSW) to undertake a traffic impact assessment that is intended to accompany a State Significant Development Application at Bankstown North Public School, Bankstown.

A masterplan is purposed to increase student enrolment from the current 330 students to 644 students.

Currently the kiss and drop off area on Beresford Avenue is observed to be queued back from the cul-de-sac to the Hume Highway intersection. With increasing drop off / pick up demand, the queue is expected to extend onto Hume Highway. A number of options have been explored to cater for the increasing demand for drop off / pick up, by altering the traffic flow on Beresford Avenue and/or Davis Lane, as well as within the School.

This report sets out the methodology and findings of the study to assess the traffic, parking and the road network related considerations associated with the proposal.

This study addresses the key topics related to traffic and parking impacts typically associated with the School, being:

- Traffic activity associated with students and the impact on the road network,
- Traffic activity associated with staff and the impact on the road network,
- On-campus parking provision and demand associated with staff,
- The safety of pedestrians, students and other road users in the vicinity of the School,
- The warrants for providing additional traffic and/or parking facilities either within the road network or within the School.

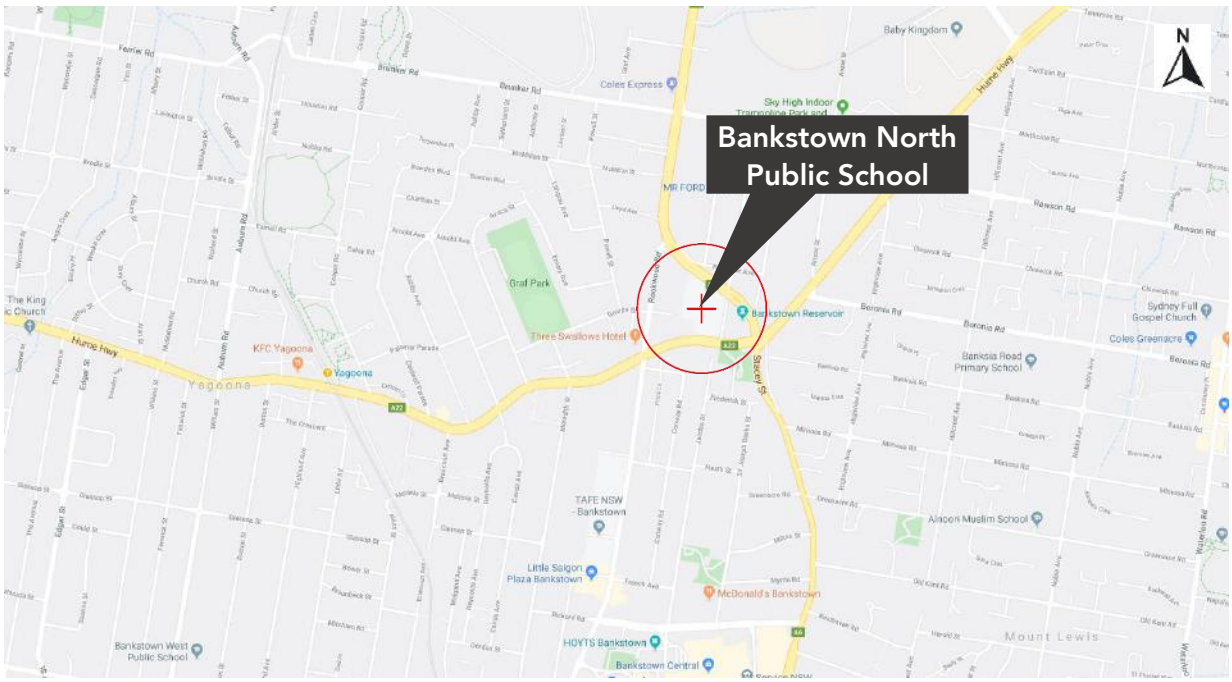


Figure 1 – Site Location

2.2 Response to SEARs

SEARs Requirement	ptc. Response
Accurate details of the current daily and peak hour vehicle, existing and future public transport networks and pedestrian and cycle movement provided on the road network located adjacent to the proposed development	Refer to Section 3, Section 7.1 and to Green Travel Plan prepared by ptc. on 30/09/2020
Details of estimated total daily and peak hour trips generated by the proposal, including vehicle, public transport, pedestrian and bicycle trips based on surveys of the existing and similar schools within the local area	Refer to Section 6.2, Section 7.1 and to Green Travel Plan prepared by ptc. on 30/09/2020
The adequacy of existing public transport or any future public transport infrastructure within the vicinity of the site, pedestrian and bicycle networks and associated infrastructure to meet the likely future demand of the proposed development	Refer to Section 3.2 and to Green Travel Plan prepared by ptc. on 30/09/2020
Measures to integrate the development with the existing/future public transport network	Refer to Section 7.1
The impact of trips generated by the development on nearby intersections, with consideration of the cumulative impacts from other approved developments in the vicinity, and the need/associated funding for, and details of, upgrades or road improvement works, if required (Traffic modelling is to be undertaken using SIDRA network modelling for current and future years)	Refer to Section 6.5
The identification of infrastructure required to ameliorate any impacts on traffic efficiency and road safety impacts associated with the proposed development, including details on improvements required to affected intersections, additional school bus routes along bus capable roads (i.e. minimum 3.5 m wide travel lanes), additional bus stops or bus bays	Refer to Section 6.5
Details of travel demand management measures to minimise the impact on general traffic and bus operations, including details of a location-specific sustainable travel plan (Green Travel Plan and specific Workplace travel plan) and the provision of facilities to increase the non-car mode share for travel to and from the site	Refer to Green Travel Plan prepared by ptc. on 30/09/2020
The proposed walking and cycling access arrangements and connections to public transport services	Refer to Section 7.1
The proposed access arrangements, including car and bus pick- up/drop-off facilities, and measures to mitigate any associated traffic impacts and impacts on public transport, pedestrian and bicycle networks, including pedestrian crossings and refuges and speed control devices and zones	Refer to Section 5.2

Proposed bicycle parking provision, including end of trip facilities, in secure, convenient, accessible areas close to main entries incorporating lighting and passive surveillance	Refer to Section 5.5
Proposed number of on-site car parking spaces for teaching staff and visitors and corresponding compliance with existing parking codes and justification for the level of car parking provided on-site	Refer to Sections 5.3 and 7
An assessment of the cumulative on-street parking impacts of cars and bus drop-off/pick-up, staff parking and any other parking demands associated with the development	Refer to Section 5.2
An assessment of road and pedestrian safety adjacent to the proposed development and the details of required road safety measures and personal safety in line with CPTED	Refer to Section 3.3.1 and Section 7.1
Emergency vehicle access, service vehicle access, delivery and loading arrangements and estimated service vehicle movements (including vehicle type and the likely arrival and departure times)	Refer to Section 7.2
The preparation of a preliminary Construction Traffic and Pedestrian Management Plan to demonstrate the proposed management of the impact in relation to construction traffic addressing the following:	Refer to Concept Construction Traffic Management Plan (CCTMP) prepared by ptc. on 20/03/2020
Assessment of cumulative impacts associated with other construction activities (if any)	Refer to CCTMP prepared by ptc. on 20/03/2020
An assessment of road safety at key intersection and locations subject to heavy vehicle construction traffic movements and high pedestrian activity	Refer to CCTMP prepared by ptc. on 20/03/2020
Details of construction program detailing the anticipated construction duration and highlighting significant and milestone stages and events during the construction process	Refer to CCTMP prepared by ptc. on 20/03/2020
Details of anticipated peak hour and daily construction vehicle movements to and from the site	Refer to CCTMP prepared by ptc. on 20/03/2020
Details of on-site car parking and access arrangements of construction vehicles, construction workers to and from the site, emergency vehicles and service vehicle	Refer to CCTMP prepared by ptc. on 20/03/2020
Details of temporary cycling and pedestrian access during construction	Refer to CCTMP prepared by ptc. on 20/03/2020
Details of construction vehicle routes, peak hour and daily truck movements, hours of operation, access arrangements at all stages of construction and traffic control measures for all works	Refer to CCTMP prepared by ptc. on 20/03/2020

Details of access arrangements for workers, emergency services and the provision for sage and efficient access for loading and deliveries	Refer to CCTMP prepared by **ptc.** on 20/03/2020

2.3 Purpose of this Report

This report presents the following considerations in relation to the Traffic and Parking assessment of the Proposal:

Section 1	Introduction and brief description of the proposal;
Section 2	Description of the existing transport facilities serving the school;
Section 3	School Travel Characteristic with a description of the survey results;
Section 4	Assessment of the proposed parking provisions;
Section 5	Determination of the traffic activity associated with the school upgrade, including an assessment of the adequacy of the surrounding road network;
Section 6	Assessment of the proposed car park, vehicular access and internal circulation arrangements in relation to compliance with the relevant standards, and Council policies; and
Section 7	Conclusion and Recommendations.

2.4 Site Context

BNPS is located at 322 Hume Highway in Bankstown, approximately 16 kilometres southwest of Sydney CBD. It is also located north of St Felix Catholic Primary School, east of Graf Park and west of Bankstown Reservoir.

The School has frontage to Hume Highway in the south, Stacey Street in the north and Beresford Avenue in the east. It also has access to Davis Lane in the west.

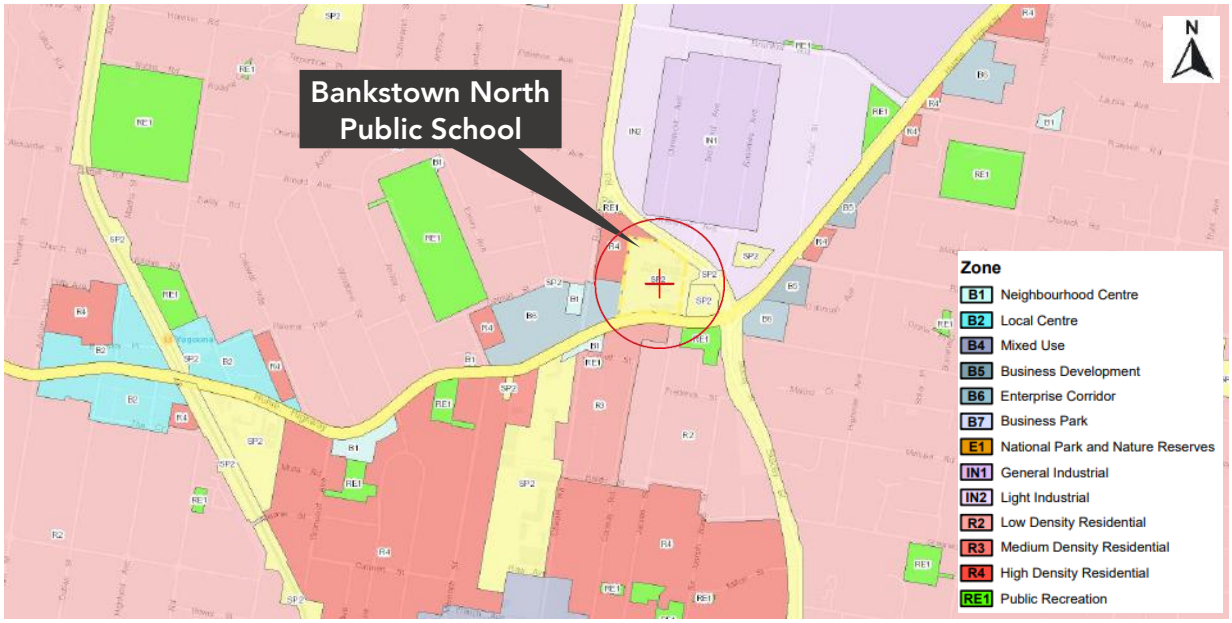


Figure 2 – Land Zoning

In terms of land use, the School is located within an area that is predominantly residential, with industrial land use located in the north. The residential land uses in the south are generally high density residential while the land uses to the east and west are generally low density. In addition, there are enterprise corridor and business development land use along Hume Highway.

The School is comprised of the following lots:

- Lot 1 of DP 441732, DP 501320 and DP 772787;
- Lot 1, Section 5 of DP 192509;
- Lot 11, 12, 13 and 14 of DP 132498;
- Lot 14 of DP 1000689
- Lot 7 and 8 of DP 441703; and
- Lot A of DP 399940 and DP 444924

The aerial photograph in Figure 3 provides an overview of the area and context in relation to the surrounding land uses.

Figure 4 shows the extent of the enrolment catchment of BNPS. It is noted that out of 325 students 72% (235) reside within this area.

Figure 3 – Site Context

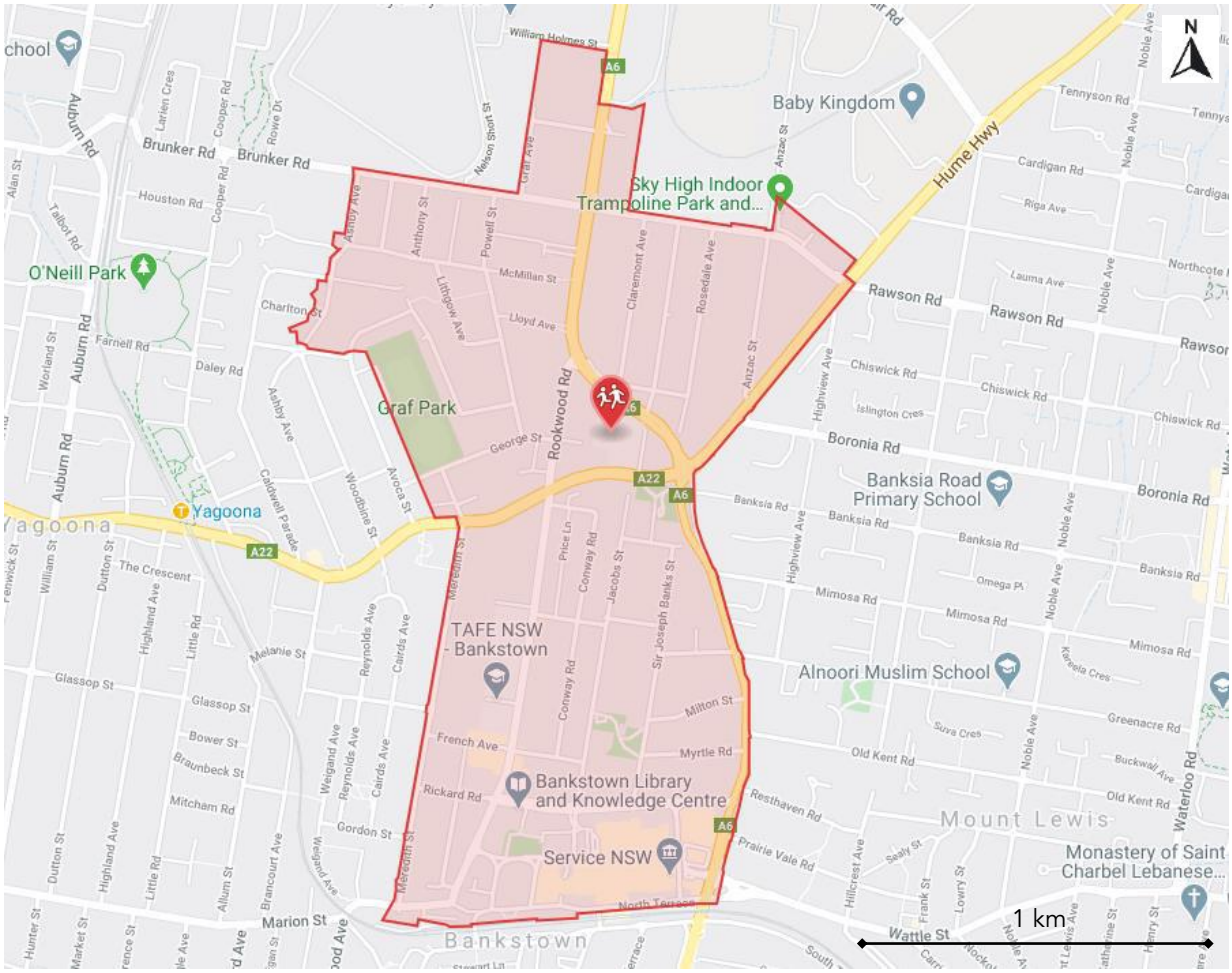


Figure 4 – Enrollment Catchment

2.5 Development Proposal

As previously mentioned, there are currently 330 students enrolled at Bankstown North Public School, which is proposed to be upgraded to accommodate 644 students by 2026.

The proposed site layout plan of BNPS is illustrated in Figure 5. The architectural drawings are shown in Attachment 1.

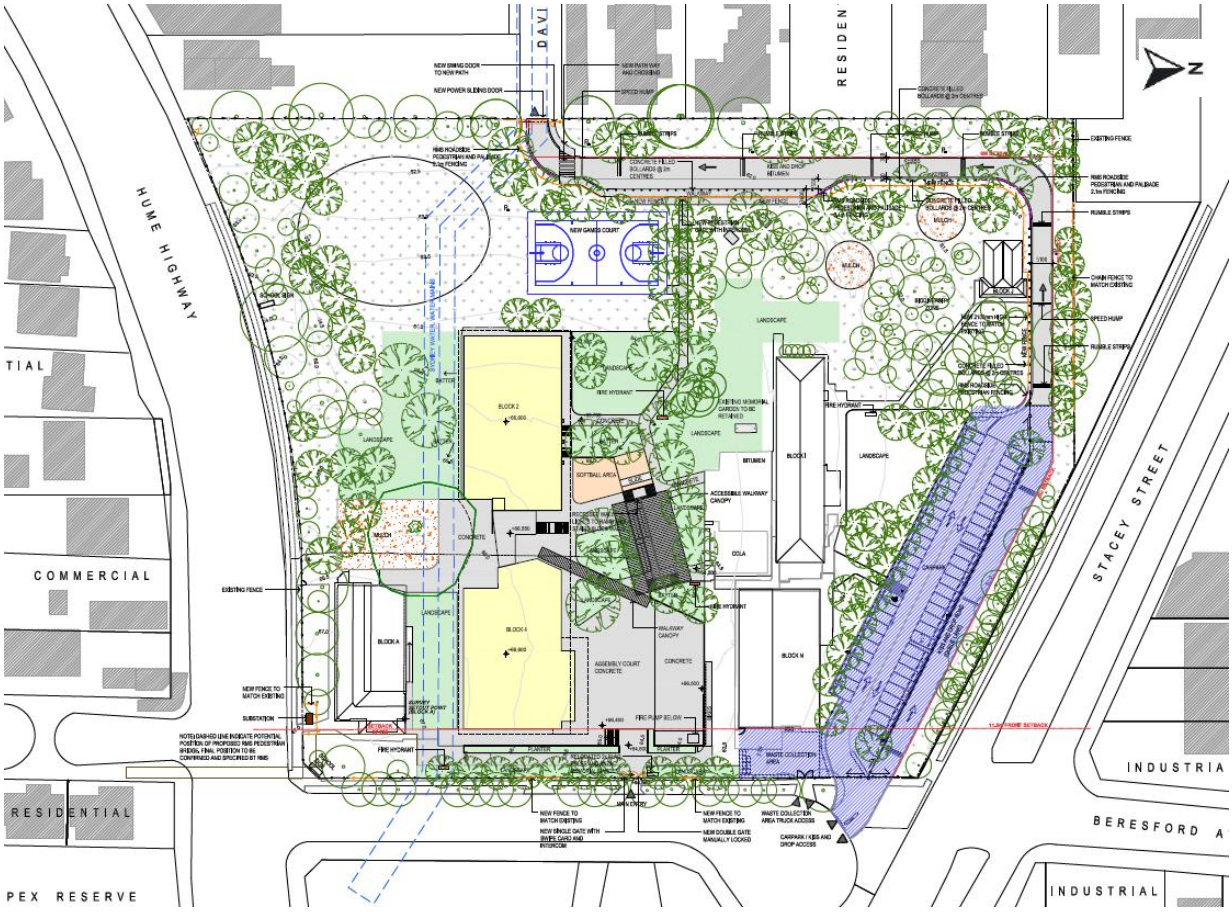


Figure 5 – Proposed Development

The proposal includes the construction of 30 new permanent teaching spaces (including 4 disability support units) and the refurbishment of 6 teaching spaces. In summary, the masterplan involves the following:

- Block 4: Staff, Admin, Library and Special Programs
- Block 2: 24 HBU and Student Amenities (Core21) to be located north of the SW Water Pipe
- Assembly Space
- Games Court
- Carpark with 56 parking spaces separate to the Kiss & Drop facility
- Landscaping
- Necessary infrastructure upgrades
- Air-conditioning

- Temporary School as required (Blocks A, N & I to be reused)
- Block B to be demolished

3. Existing Transport Facilities

3.1 Road Hierarchy

The School is located between Hume Highway, Stacey Street and Rookwood Road, all of which are state roads, and in this regard the school has a very good connection to the arterial road network. A network of State Roads, Regional Roads and Council-managed Local Roads provide access to the school and the greater suburb of Bankstown and Sydney. The surrounding road network is illustrated in Figure 6.

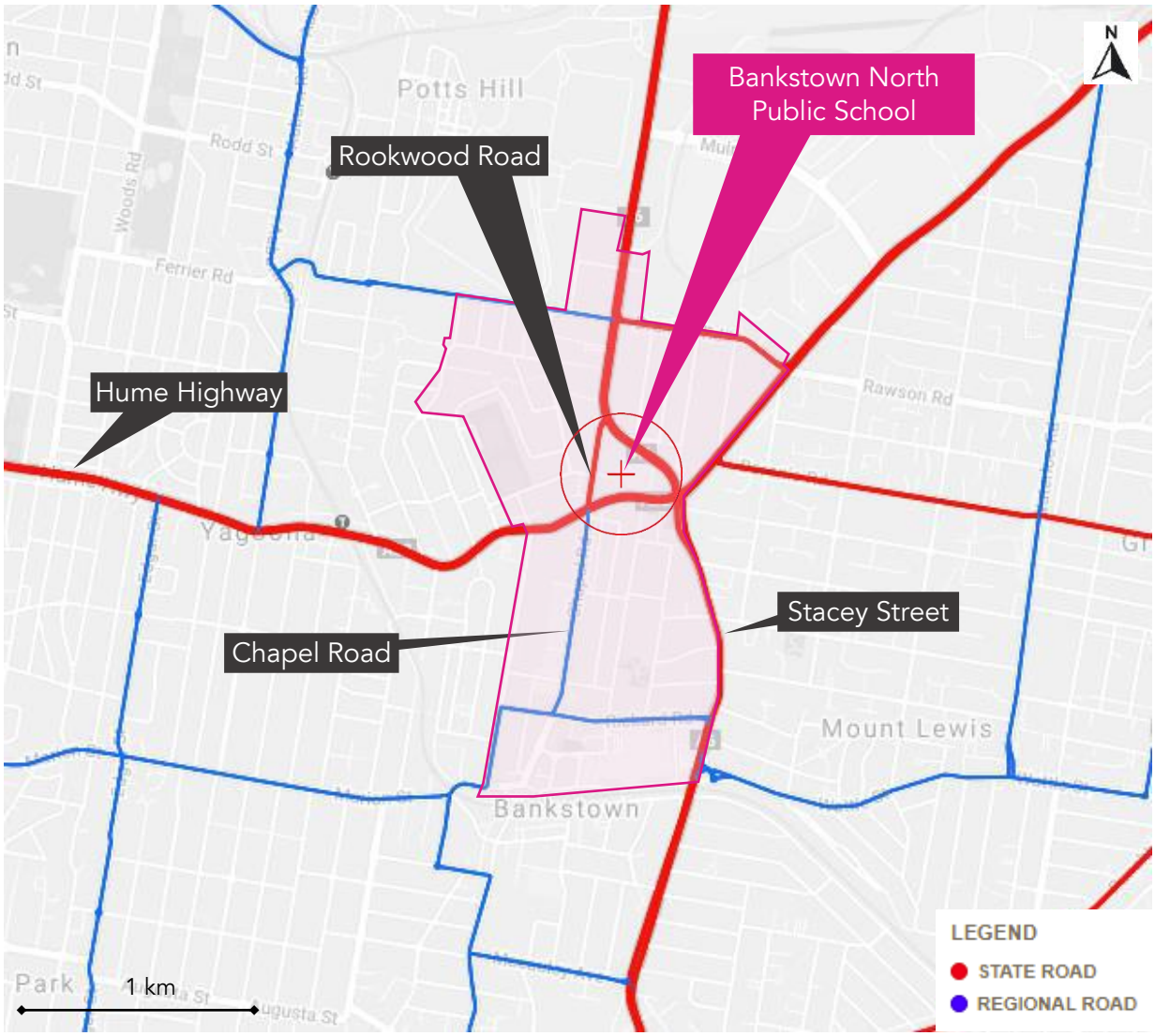


Figure 6 – Road Hierarchy

The NSW administrative road hierarchy comprises the following road classifications, which align with the generic road hierarchy as follows:

State Roads	- Freeways and Primary Arterials (RMS Managed)
Regional Roads	- Secondary or Sub Arterials (Council Managed, partly funded by the State)
Local Roads	- Collector and Local Access Roads (Council Managed)

Hume Highway	
Road Classification	State Road
Alignment	East-West
Number of Lanes	3 lanes in each direction
Carriageway Type	Divided
Carriageway Width	23m
Speed Limit	60 km/h
School Zone	Yes, from Stacey Street to The Boulevarde
Parking Controls	Clearway 6am-10am eastbound & 3pm-7pm westbound Mon-Fri
Forms Site Frontage	Yes

Figure 7 – Hume Highway – Eastbound from Beresford Avenue

Stacey Street	
Road Classification	State Road
Alignment	North-South
Number of Lanes	2 lanes in each direction
Carriageway Type	Divided
Carriageway Width	22m
Speed Limit	70 km/h
School Zone	No
Parking Controls	Clearway 6am-7pm Mon-Fri & 9am-6pm Sat-Sun & Public Holidays
Forms Site Frontage	Yes

Figure 8 – Stacey Street – Northbound from Beresford Avenue

Rookwood Road	
Road Classification	State Road
Alignment	North-South
Number of Lanes	1 lane northbound & 2 lanes southbound
Carriageway Type	Undivided
Carriageway Width	13m
Speed Limit	60 km/h
School Zone	Yes, from Hume Highway to George Street
Parking Controls	Time restricted parking northbound & No Parking southbound
Forms Site Frontage	No

Figure 9 – Rookwood Road – Southbound from George Street

Chapel Road	
Road Classification	Regional Road
Alignment	North-South
Number of Lanes	2 lanes northbound & 1 lane southbound
Carriageway Type	Undivided
Carriageway Width	12m
Speed Limit	60 km/h
School Zone	Yes, from Hume Highway to Heath Street
Parking Controls	No
Forms Site Frontage	No

Figure 10 – Chapel Road – Southbound from Corbett Street

Beresford Avenue	
Road Classification	Local Road
Alignment	North South
Number of Lanes	1 lane eastbound, and 2 lanes westbound
Carriageway Type	Undivided
Carriageway Width	12m
Speed Limit	50 km/h
School Zone	Yes
Parking Controls	No parking 8am-9:30am & 2:30pm-4pm Mon-Fri, 1/4 Hour Parking
Forms Site Frontage	No

Figure 11 – Beresford Avenue – Northbound from Hume Highway

Overall, all roads surrounding the school are classified roads with speed limits over 50km/h, which creates a significant barrier for students who would wish to walk to and from school. In particular, Hume Highway and Stacey Road are major vehicular links, thereby creating unhostile environment for pedestrians, but specifically for young students.

In addition, divided carriageways lead to longer and therefore less safe crossing opportunities.

3.2 Public Transport

The locality of the School has been assessed in the context of available modes of transport that may be utilised by students, parents and staff members. When defining accessibility, the NSW Planning Guidelines for Walking and Cycling (2004) suggest a 400m – 800m catchment is a comfortable walking distance to access public transport and local amenities.

Figure 12 illustrates 400m and 800m catchments from BNPS, together with a number of public transport options and network, which are available in the vicinity of the site. Details of public transport options available are outlined in the following sections.

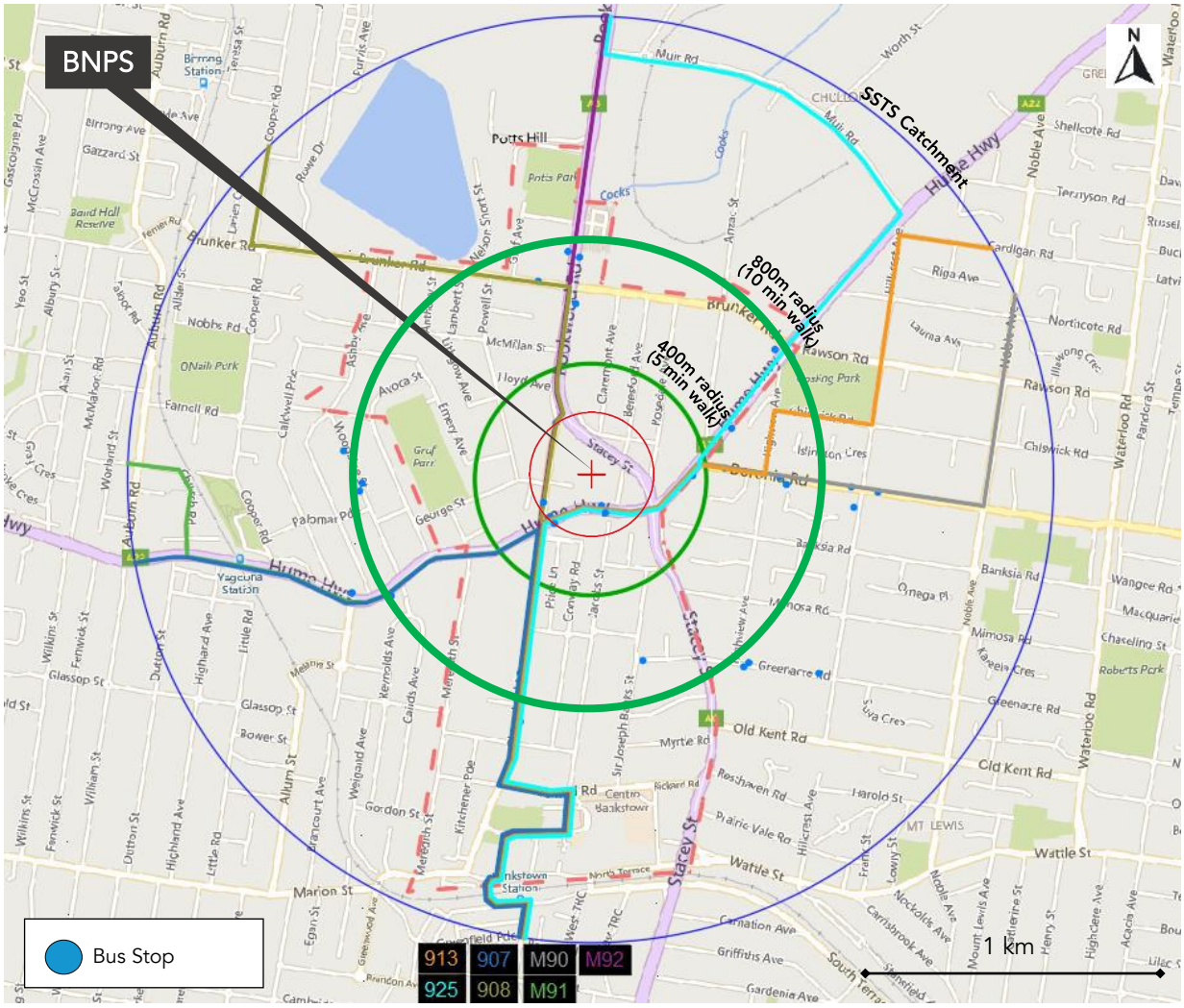


Figure 12 – Surrounding Public Transport (Bus Services)

3.2.1 Bus Services

As shown in Figure 12 there is a number of bus services within the 400m and 800m catchment. The closest bus stop is located on Hume Highway which is 150 metres away from the School. The bus services, including coverage, approximate operation times and frequency, are summarised in Table 1.

Table 1 – Bus Services Frequency

Route	Frequency (approx.)	Coverage	Stop Location
907	**Every 20 minutes from 5:13am to 9:54pm Mon-Fri Every 20 minutes from 7:07am to 8:36pm on weekends**	**Parramatta to Bankstown via Bass Hill**	**300m**
908	**Hourly from 7:25am to 5:50pm Mon-Fri Hourly from 9:00am to 4:21pm on weekends**	**Merrylands to Bankstown via Birrong and Auburn**	**260m**
913	**Only operate hourly from 5:32am to 4:49pm Mon-Fri**	**Bankstown to Strathfield**	**50m**
925	**Every 30 minutes from 7:02am to 9:06pm Mon-Fri Hourly from 7:43am to 6:43pm on weekends**	**East Hills to Lidcombe via Bankstown**	**50m**
M90	**Every 20 minutes from 6:20am to 8:52pm Mon-Fri Every 20 minutes from 7:05am to 8:12pm on weekends**	**Burwood to Liverpool**	**50m**
M91	**Every 10 minutes from 5:20am to 11:30pm Mon-Fri Every 20 minutes from 6:36am to 11:20pm on weekends**	**Hurstville to Parramatta via Padstow & Chester Hill**	**300m**
M92	**Every 10 minutes from 6:06am to 9:20pm Mon-Fri Every 20 minutes from: 7:26am to 8:26pm on weekends**	**Sutherland to Parramatta**	**260m**

The development is relatively well serviced by buses, with regular services every 10-60 minutes throughout the day on weekdays. However, the routes generally cover the main roads surrounding the school, but not the residential areas in the vicinity. Therefore, buses may provide an alternative mode share option for staff, subject to the availability of convenient bus stops close to their home location, but students are not likely to utilise this mode share.

It is noted that the entire enrolment area lies within the SSTS exclusion zone, meaning that none of the students residing there (72%) are eligible for discounted passes. This reduces the probability of public transport utilisation by BNPS students. In addition, only a small proportion of students residing along Chapel Road live within 400m of a bus route that would bring them closer to the school, but the trip would last only 2 stops, making the entire journey inconvenient and therefore unlikely to be taken.

18% of students live within the SSTS area and would be eligible for the discounted passes. However, only 41% of those students live within 400m of a bus that would bring them to school.

The public transport infrastructure is not child friendly.

Figure 13 shows the existing bus locations and pedestrian connectivity between them and the school. The bus stops on the northern side of Hume Highway can be directly accessed, but it is noted that the footpaths are substandard, narrow and run along a busy state road. Bus stops which provide services in the opposite direction will require students to cross the Hume Highways at the Beresford Avenue intersection.

The bus stop on Rookwood Road is sheltered and services 2 of the buses. Students using this bus stop will be required to either travel south down Rookwood Road, then along the Hume Highway and turn left into Beresford Avenue, or walk north, cross Davis Lane, then turn left to access the site. The opposing bus stop

also provides shelter, however, does not provide a clear indication that it is a bus stop and requires students to cross the road.

There are also two stops along either side of Chapel Street which service the final two bus routes. The stops will require students to cross the Hume Highway, walk towards Beresford Avenue and turn left, or walk northbound along Rookwood Road, cross Davis Lane, then turn left to access the site. Only the bus stop on the western side has a shelter for travellers.

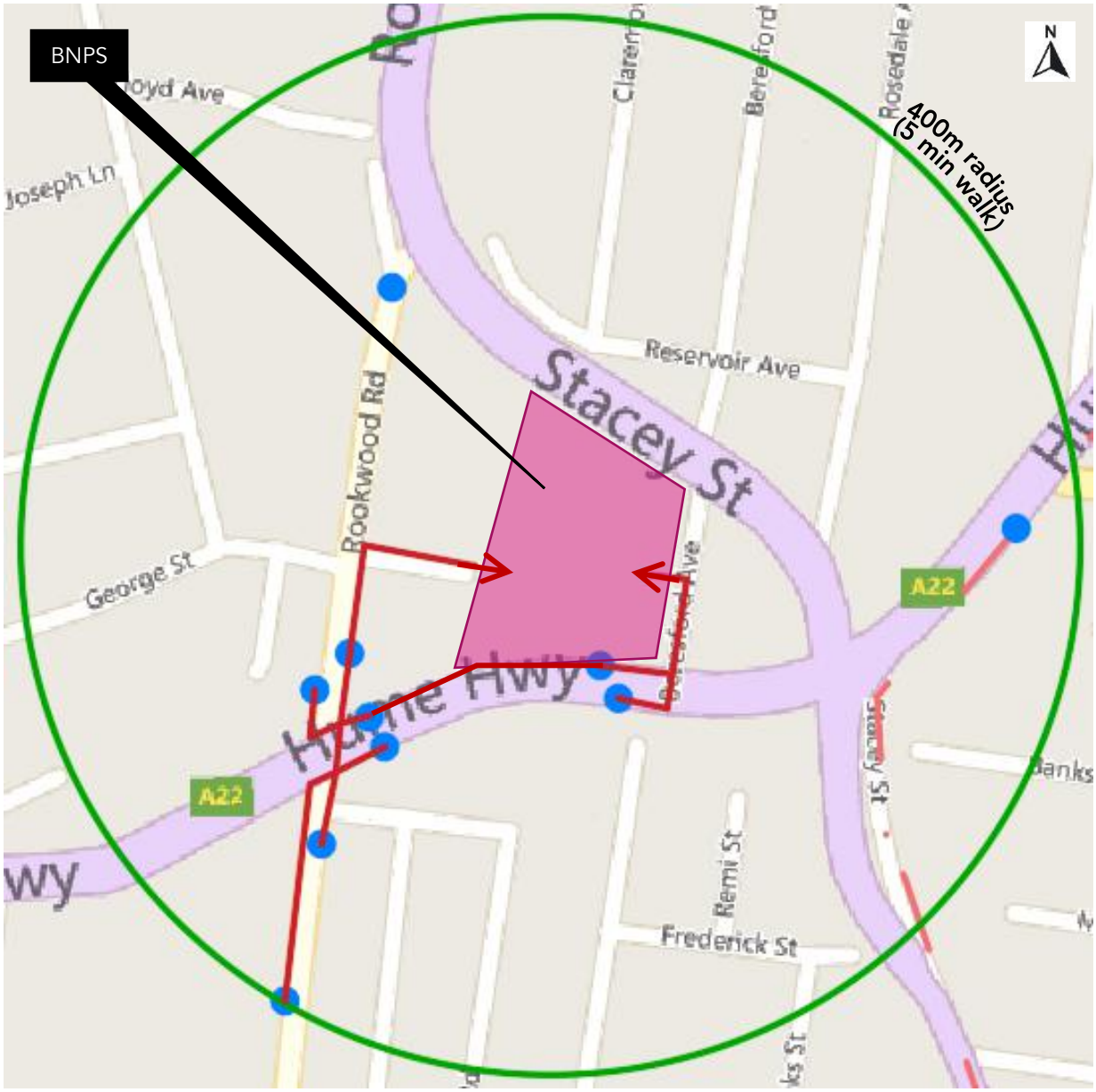


Figure 13 – Existing Bus Infrastructure

Overall, buses are not considered to be a viable travel option for students for the following reasons:

- There is a lack of bus routes within residential areas;
- The links between bus stops on the school side of the highway and the school property are substandard, the footpath along the Hume Highway does not provide optimal safety for students and there is no formalised crossing at Davis Lane;

- Bus stops across the road of the school require students to cross wide and busy state roads.

3.2.2 Rail

Yagoona Station and Bankstown Station are located approximately 1.4km and 1.5km walking distance from the School respectively, which both provides services to T3 – Bankstown line.

Table 2 – Rail Services

Rail Route	From	To	Frequency on Weekdays (approx.)
T3 – Bankstown Line	**Liverpool or Lidcombe**	**Sydney CBD**	**Every 10 minutes Mon-Fri** **Every 15 minutes on weekends**

Services via the Bankstown Line are frequent and provide excellent availability throughout the day, especially during peak hours.

It is worth noting that in 2024, Bankstown Station will be converted into a Metro Station. In doing so the City of Canterbury-Bankstown will be upgrading the active transport routes to and from the station.

It is not envisaged that students utilise rail as a means to commute to school, as most of the pupils live within the enrolment catchment. However, some staff may utilise this transport option.

3.3 Active Travel

The locality was reviewed for features that would attract active transport trips (walking and cycling), with reference to the NSW Guidelines for Walking and Cycling (2004).

3.3.1 Walking

Walking is a viable transport option for distances under one kilometre (approximately 15-20min) and is often quicker for short trips door to door. Walking is also the most space efficient mode of transport for short trips and presents the highest benefits. Co-benefits where walking replaces a motorised trip include improved health for the individual, reduced congestion on the road network and reduced noise and emission pollution.

Figure 14 shows an overview of the existing pedestrian infrastructure in the vicinity of the site.

The pedestrian network in the locality has been assessed to provide a reasonable level of walking amenities in the vicinity of the school. Major roads such as Hume Highway and Rookwood Road generally have footpaths on both sides of the road. Stacey Street provides a footpath on the western side only; however, this is likely due to the industrial character of the area north east of the school, hence students are unlikely to travel in that direction.

Some roads in the north western residential area have been identified to have either just one or no footpaths on either side of the carriageway. While it is acknowledged that the area is residential and traffic volumes are likely to be minor, at least one footpath on one side should be provided.

Nearmap aerial imagery was also used to assess the quality of the pedestrian facilities. The footpath adjacent to the school along the Hume Highway is narrow and substandard, and does not provide a nature strip separating children from the road. This could create safety issues and deter children from walking to and from school.

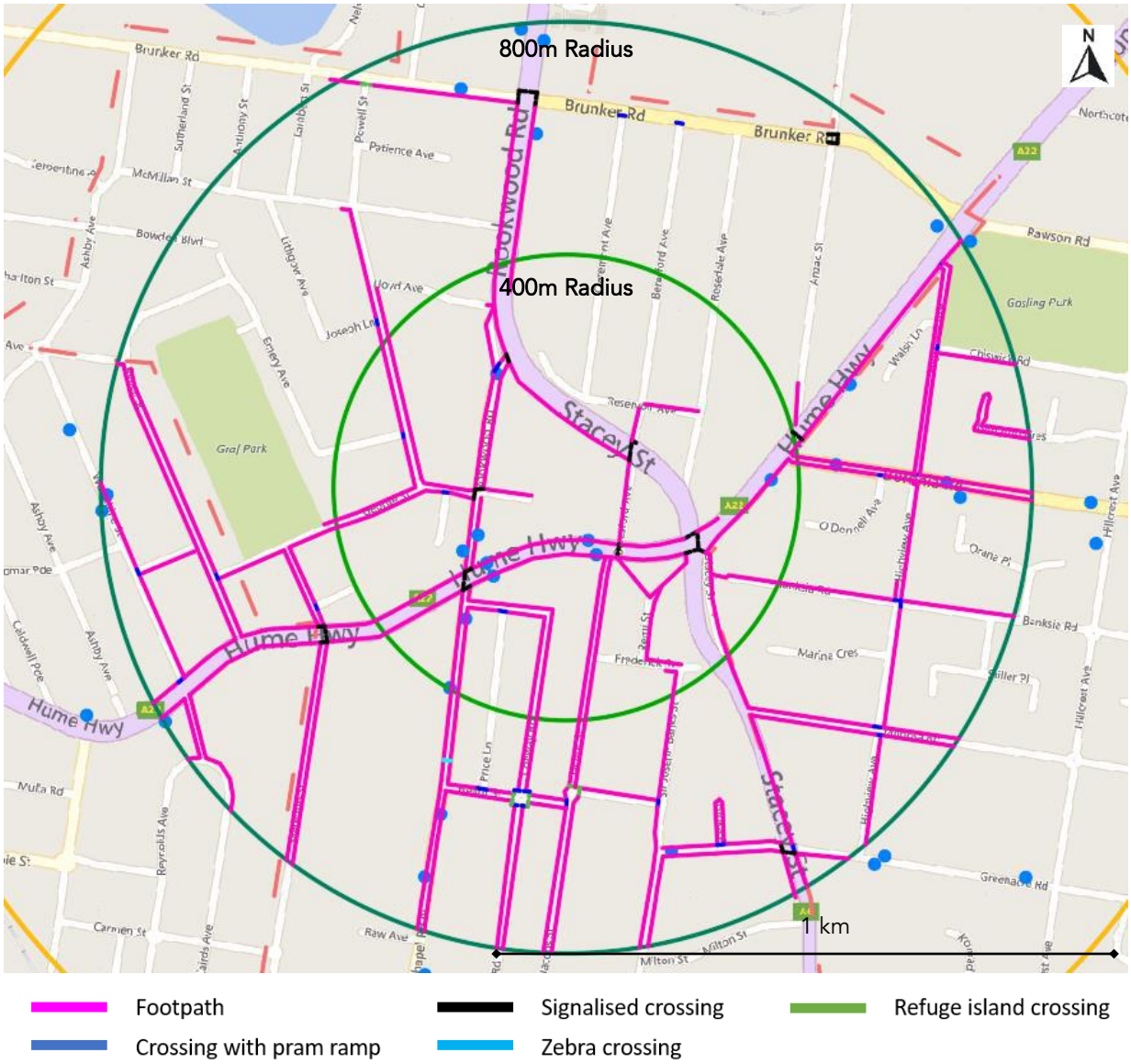


Figure 14 – Surrounding Pedestrian Infrastructure

Despite the existing facilities, Hume Highway and Rookwood Road represent a significant barrier for pedestrians, and in particular students who live south and north-west of the school. While signalised crossings are provided, the main roads are wide and busy, and therefore considered unsafe for children in primary school ages. Safer crossings could be provided by adjusting pedestrian signal timings at Hume Highway / Beresford Avenue and Rookwood Road / Davis Lane intersections.

3.3.2 Cycling

The subject site currently has poor connectivity to the bicycle network. Figure 15 presents a screenshot of the cycle map published by Council. This will discourage cycling as an alternative mode of transport for staff and students.

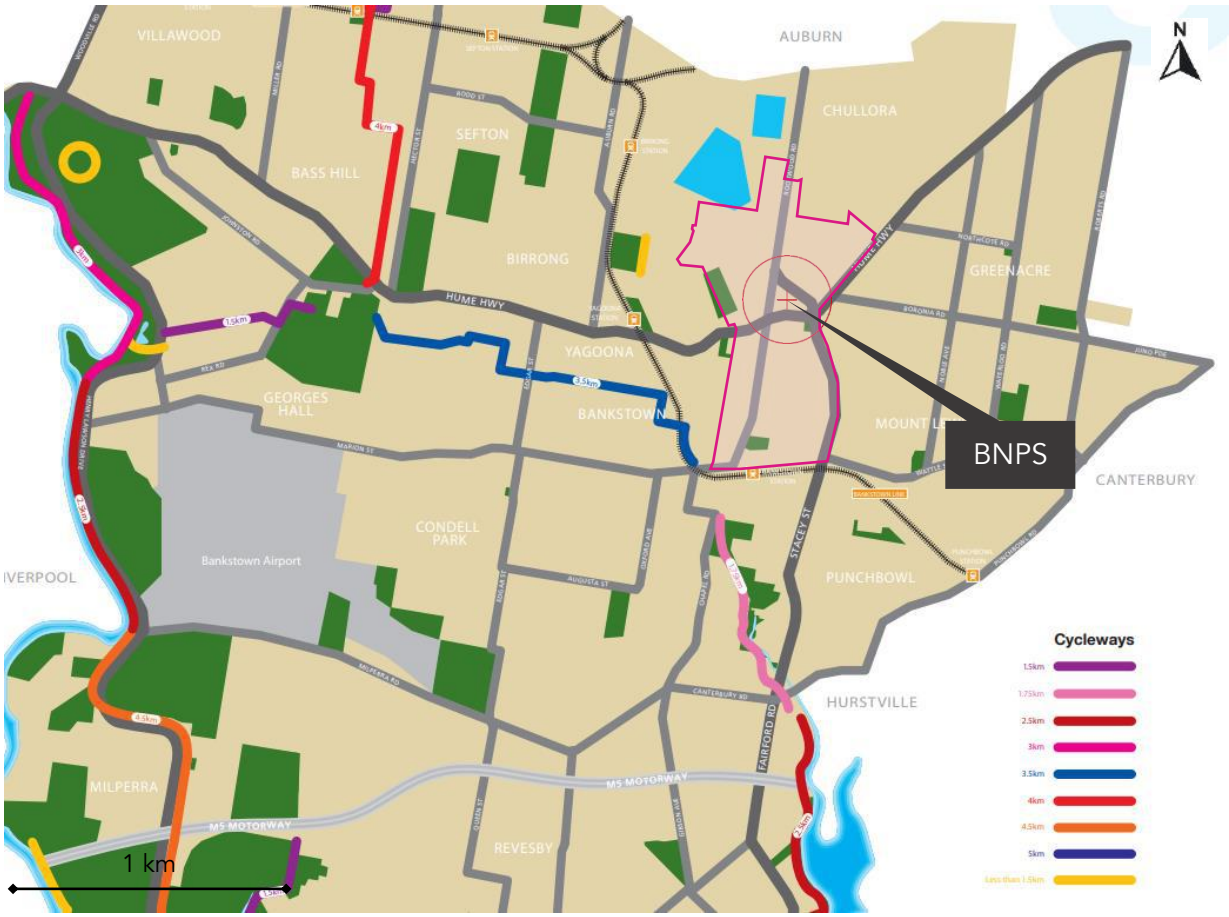


Figure 15 – Surrounding Cycle Paths (Source: Bankstown Cycleway Map)

4. Existing Travel Characteristics

The following section presents an overview of the existing mode share at the School and the current demand utilisation of pick-up / drop-off areas and short-term parking areas within the vicinity of the School.

4.1 Travel Mode Share

An online questionnaire was conducted with students and staff (two separate questionnaires). The objective of the questionnaire was to identify the existing travel behaviour and transport demand to assist with the post development forecast for traffic modelling purposes (to be discussed further in Section 5.2).

The survey was active between 22nd November and 6th December 2019 and a total of 185 responses were received, accounting for 170 out of 330 students and 15 out of 33[1] staff members.

The survey results are shown below.

4.1.1 Student Survey

The survey responses collected from the student / parent survey (Kindergarten to Year 6) show that the existing travel modes to school on a typical morning comprise predominantly private car usage (71% total with 62% students travelling with parents and 9% students travelling with another family), followed by walking (25%) and then by bus (1%) as shown in Figure 16.

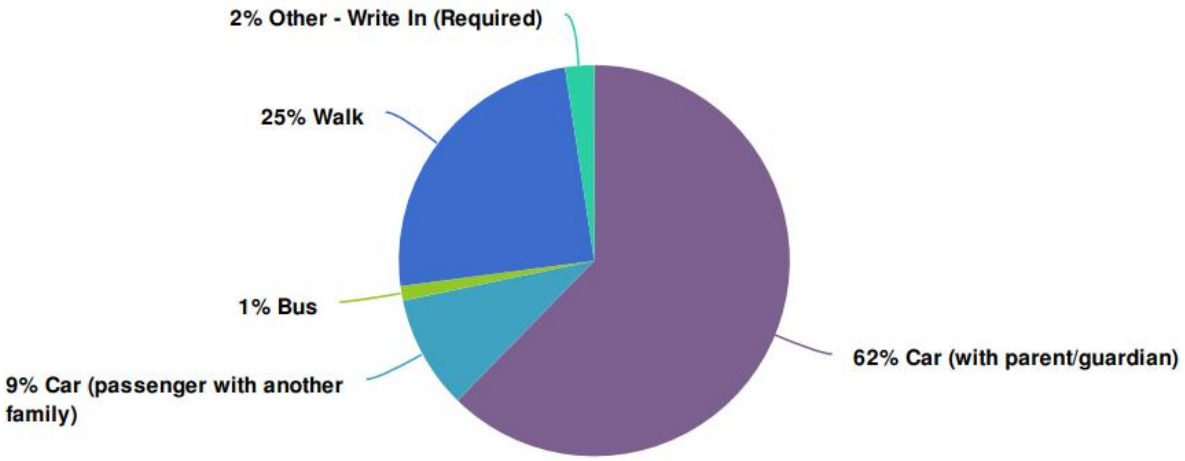


Figure 16 – Surveyed Travel Mode Split for Students Travelling to School on a Typical Morning

[1] Source: https://bankstownnorthps.com.au/our-school/staff

The factors that contribute to a high proportion of parents who drive to school include the multi-purpose use of car (e.g. driving to work), safety and increased journey time associated with travelling by public transport (refer to Figure 17).

In addition, it is noted that the school is directly bound by large roads (Hume Highway and Rookwood Road) and, as mentioned in Section 3.3.1, the pedestrian amenities within residential areas are limited. These factors are likely to contribute to a high car usage, which in turn make the school environment even less safe.

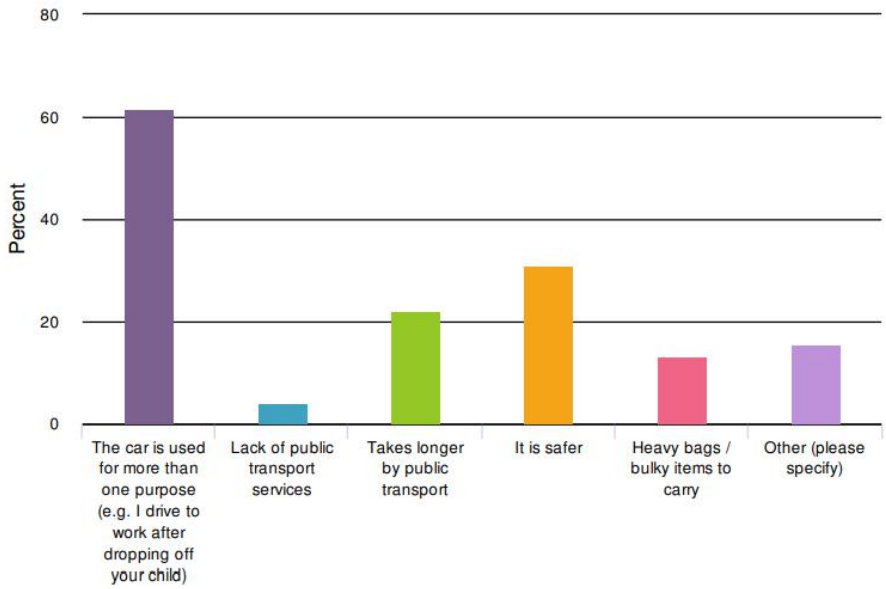


Figure 17 – Typical Reasons for Parents Travelling to School by Car

In the afternoon, 68% (-3%)[2] students (61% students with parent / guardian and 7% with another family) travel by car, 31% (+6%) students walk and 1% travel by bus as shown in Figure 18.

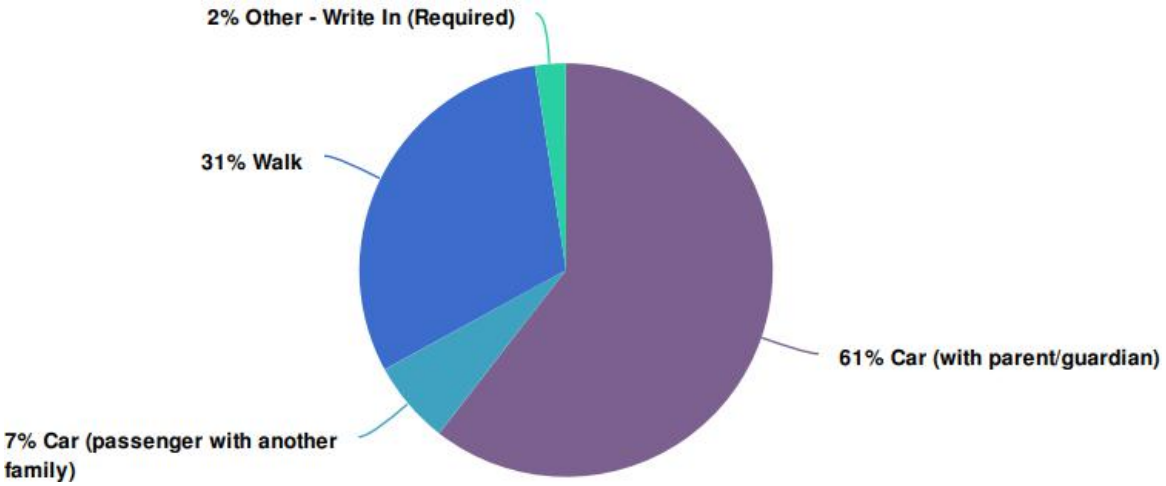


Figure 18 – Surveyed Travel Mode Split for Students Travelling from School on a Typical Afternoon

[2] Comparison with the typical morning mode share

The factors that contribute to a high proportion of parents who drive to school include the multi-purpose use of car, safety and increased journey time associated with travelling by public transport (refer to Figure 19).

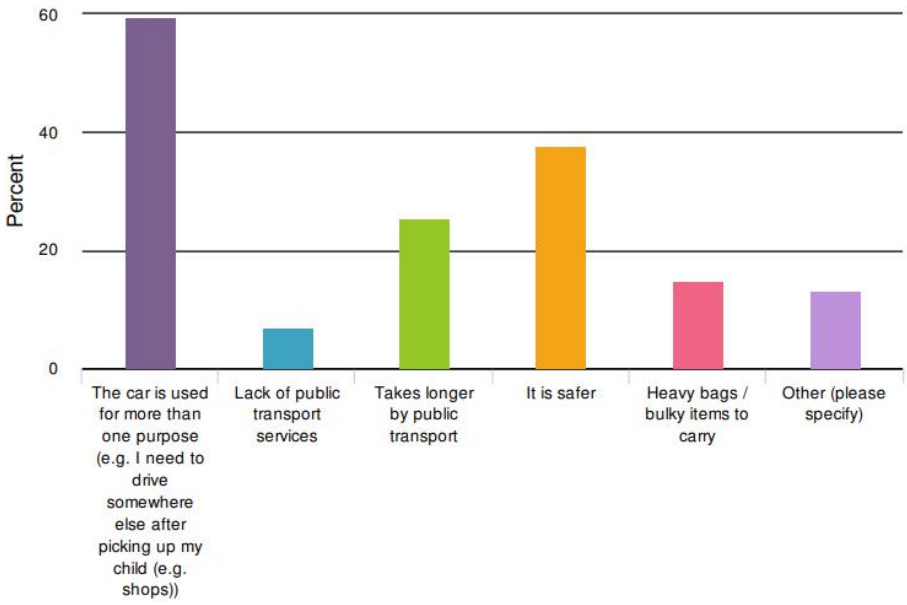


Figure 19 – Typical Reasons for Parents Travelling from School by Car

From the survey results as illustrated in Table 3, it is found that some cars include more than one student attending the school. Based on the data provided a weighted car occupancy has been calculated, which is 1.79 and 1.80 in the morning and evening respectively.

Table 3 – Carpooling Percentage of Students Travelling to School by Private Car

Student Car Occupancy	AM Peak		PM Peak	
	Percentage	No. of Responses	Percentage	No. of Responses
1	27.9%	34	28.1%	32
2	33.6%	41	31.6%	36
3	23.8%	29	23.7%	27
4	8.2%	10	7%	8
5	4.1%	5	7.9%	9
6+	2.5%	3	1.8%	2
TOTAL	100% (rounded)	122	100% (rounded)	114

In the morning, out of the students who travel by car, 57.4% are dropped off at the drop-off area on Beresford Avenue, 17.2% are dropped off on Davis Lane, 15.6% are dropped off on adjacent street (e.g., 5.7% at Jacobs Street, 4.9% at Hume Highway, 0.8% at Stacey Street, 0.8% at Conway Road) and 9.8% are dropped off at other locations.

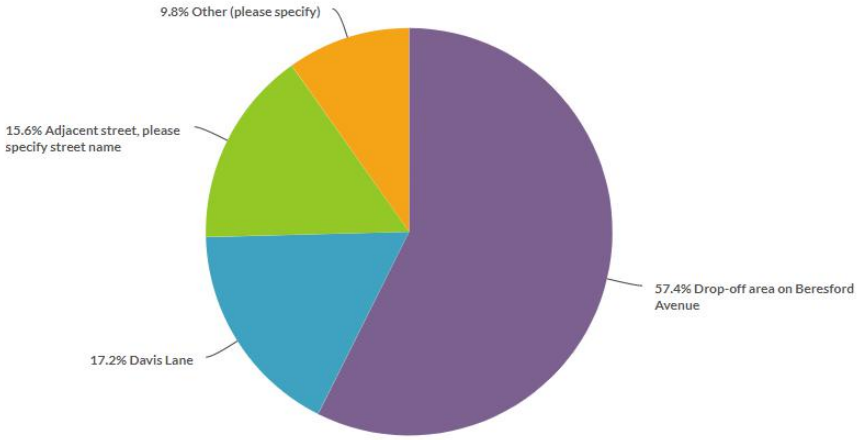


Figure 20 – Surveyed Students Drop off Locations on a Typical School Day

In the afternoon, out of the students who travel by car, 56.1% are picked up from the pick-up area on Beresford Avenue, 23.7% are picked up from Davis Lane, 11.4% are picked up from adjacent streets (e.g., 4.4% at Hume Highway, 43.5% at Jacobs Street, 0.9% at Stacey Street, 0.9% at Chapel Road) and 8.8% are picked up from other locations, refer to Figure 21 for details.

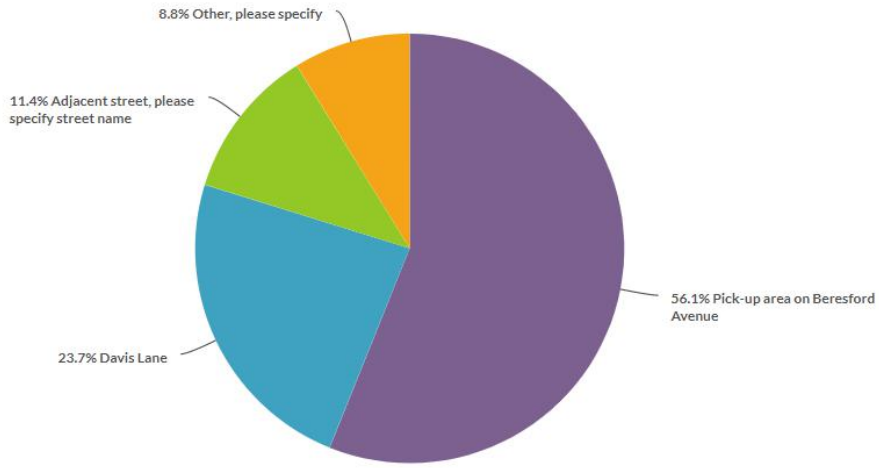


Figure 21 – Surveyed Students Pick Up Locations on a Typical School Day

Taking into consideration the online survey results, a calculation of the current number of vehicles at different drop-off and pick-up locations is shown in Table 4.

Table 4 – Current Vehicle Numbers during Drop-off and Pick-up

Total No. Students	No. Students arriving / departing by car	No. Vehicles	Drop-off / Pick-up location		No. Vehicles at locations
AM Drop-off					
330	62% (arr. with parents) + 9% (arr. with other family) = 71% (arriving by car) => 234 students	1.79 (car occupancy) => 131 vehicles	Beresford Avenue	57.4%	75
			Davis Lane	17.2%	23
			Other	25.4%	33
				TOTAL:	131
PM Pick-up					
330	61% (dep. with parents) + 7% (dep. with other family) = 68% (departing by car) => 224 students	1.8 (car occupancy) => 125 vehicles	Beresford Avenue	56.1%	70
			Davis Lane	23.7%	30
			Other	20.2%	25
				TOTAL:	125

Based on the table above, it is assumed that a total of 131 and 125 vehicles in the morning and afternoon respectively undertake drop-off and pick-up activities around the school.

The area where the students live has been mapped based on actual student location data as shown in Figure 22. Within the enrolment area, 57% of students live south and 15% north of Hume Highway.

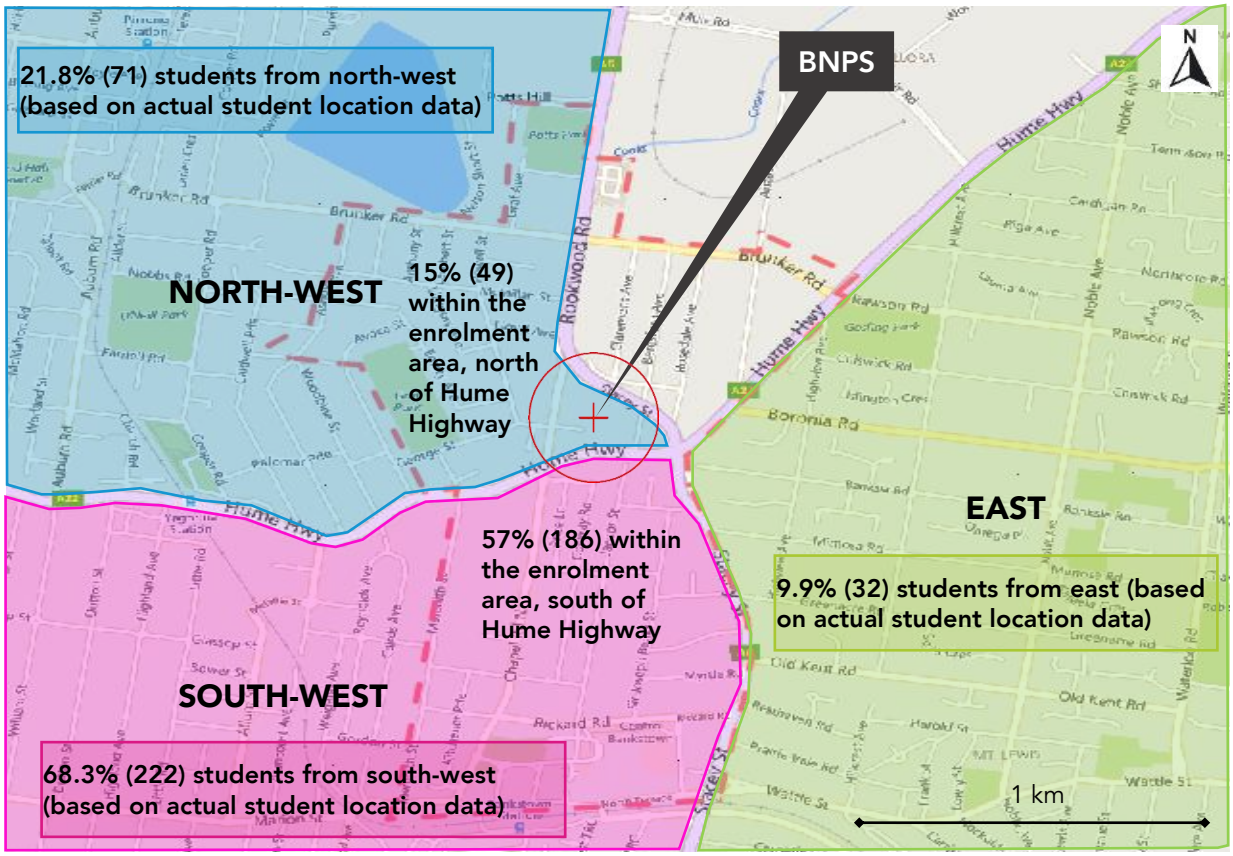


Figure 22 – Students' Area of Residence

Considering the small enrolment area and that 72% of students live within it, the proportion of students who are driven to / from school (71% in the morning / 68% in the afternoon) is very high compared with other schools.

4.1.2 Staff Survey

Regarding the travel mode for school staff, the results indicate that all staff travel to and from the school by car as driver and all staff park within the school's car park.

The factors which contribute to a high proportion of staff who drive to school include the increased journey time and lack of direct routes associated with travelling by public transport, as well as the car is used as a part of another trip (drop off children / partner at school /work) (refer to Figure 23).

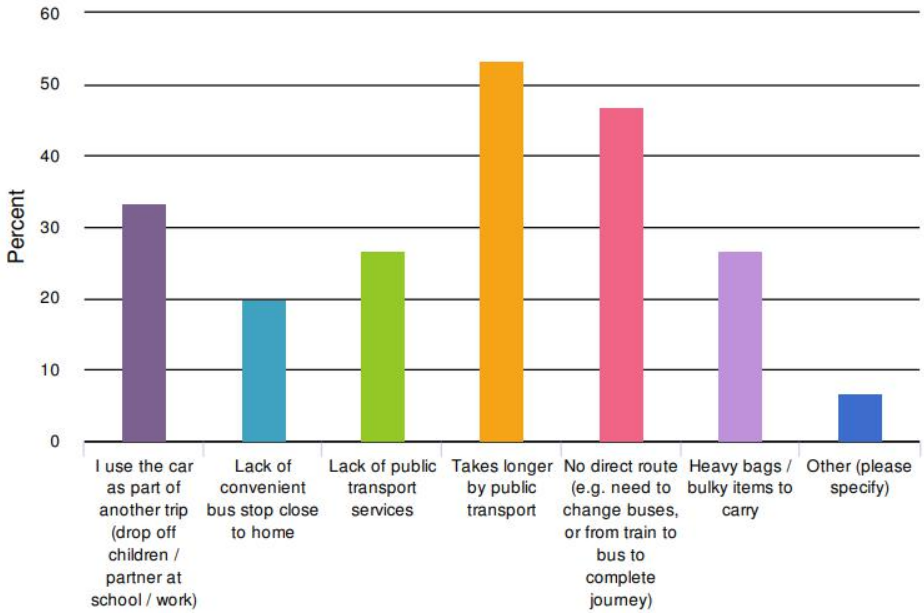


Figure 23 – Typical Reasons for Staff Travelling to and from School by Car

The survey data indicates that the majority of staff arrive to school between 7:00am – 9:00am and very few arrive after 9:00am. It can also be seen that the majority of staff leave the school between 4:00pm – 5:00pm on weekdays other than Wednesday; On Wednesdays, the majority of staff leave after 5:00pm. The details of staff arrival and departure times are presented in Figure 24 and Figure 25 respectively.

It is noted that the peak arrival time of staff mostly coincides with the network AM and PM peak hours.

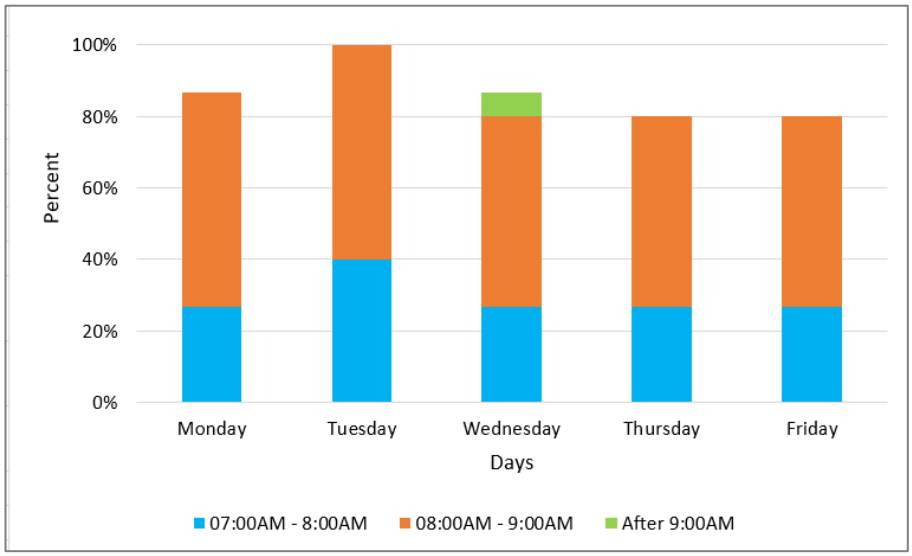


Figure 24 – Staff Arrival Times on a Typical Morning

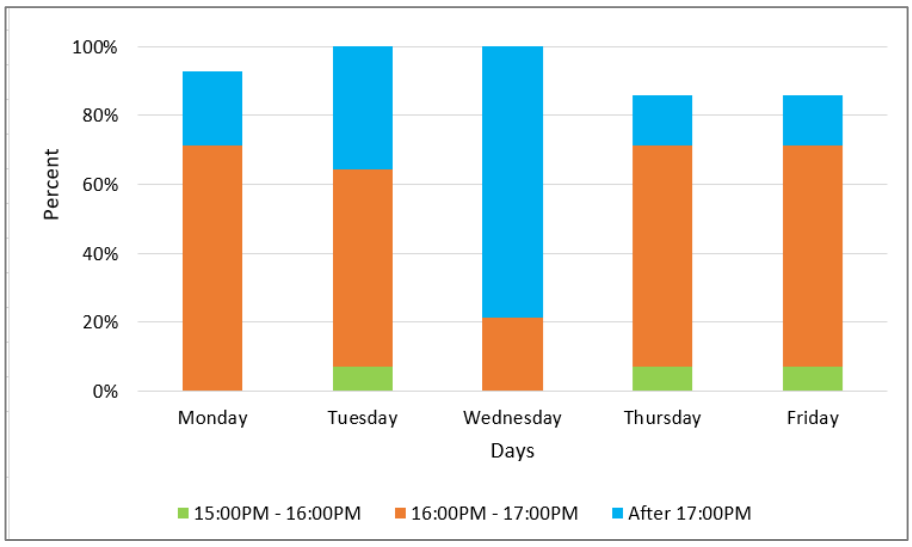


Figure 25 – Staff Departure Times on a Typical Afternoon

4.2 Students / Parents Comments

Some of the most prevalent or relevant comments are summarised below:

- Parking related comments:
    - Bigger pick-up and drop-off / car park area should be provided (x16);
    - There should be a waiting bay for parents who need to wait if their children need to stay back (x4);
- Comments regarding the pick-up and drop-off operation:
    - Designated staff instead of teachers to coordinate the pick-up process, as it takes 10 minutes before the first child comes out (x5);
    - Staff should be faster in reading out car numbers in order to speed up the pick-up process (x3);

- More supervision staff is required (x3);
- Supervision on Davis Lane is required;

- Comments regarding pedestrian safety:
  - A foot bridge across Hume Highway would be great to provide safer crossing for students (x2);

4.3 Drop off & Pick up Survey

A drop off and pick up survey has been undertaken on Thursday, 7th November, 2019 between 7am and 9am as well as between 2:30pm and 6:00pm recording the arrival and departure times of each vehicle on Beresford Avenue. Figure 26 presents the extent of the drop off and pick up survey.

Figure 26 – Extent of Drop Off / Pick Up Survey

The survey recorded 71 drop off vehicles and 58 pick-up vehicles in the morning and afternoon school peaks respectively. The results of the survey are presented in Figure 27 and Figure 28 which illustrate the cumulative drop off / pick up demand at any given time in the school peak hours. It was found that the on street drop off and pick up demand peaked at 6 and 19 spaces in the AM and PM school peak respectively, which is reasonable as the dwell times for dropping off are generally smaller than those of pick up activities.

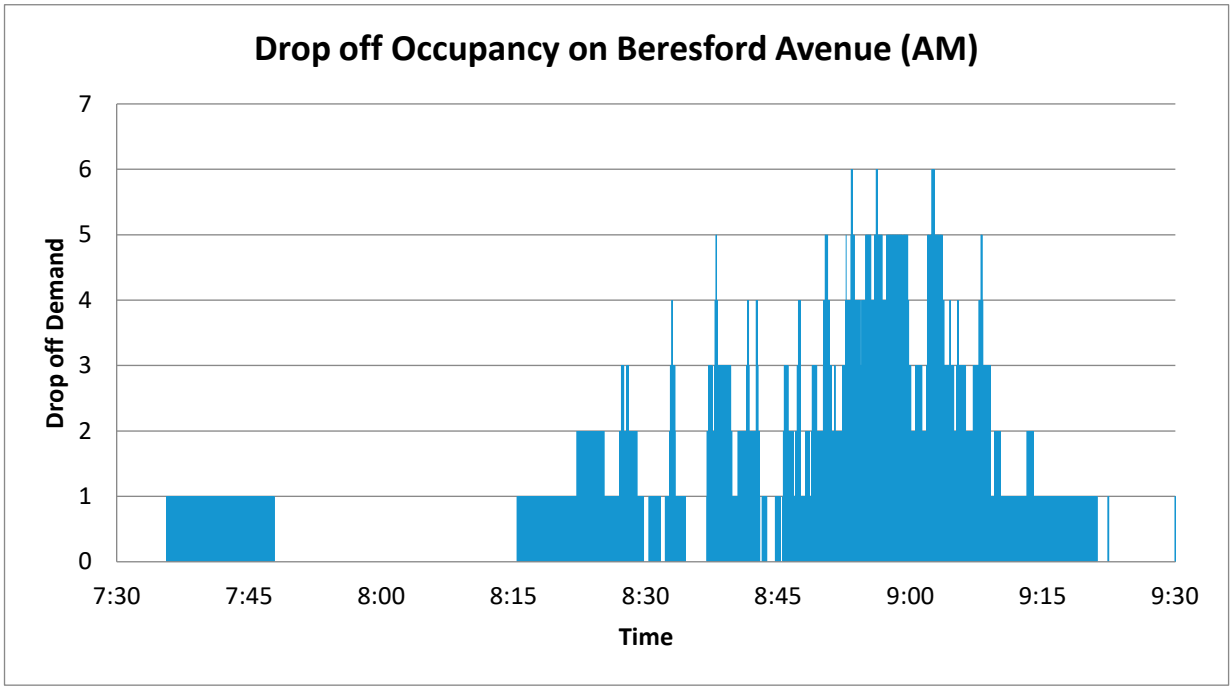


Figure 27 – Cumulative On-street Parking Occupancy on Beresford Avenue (AM)

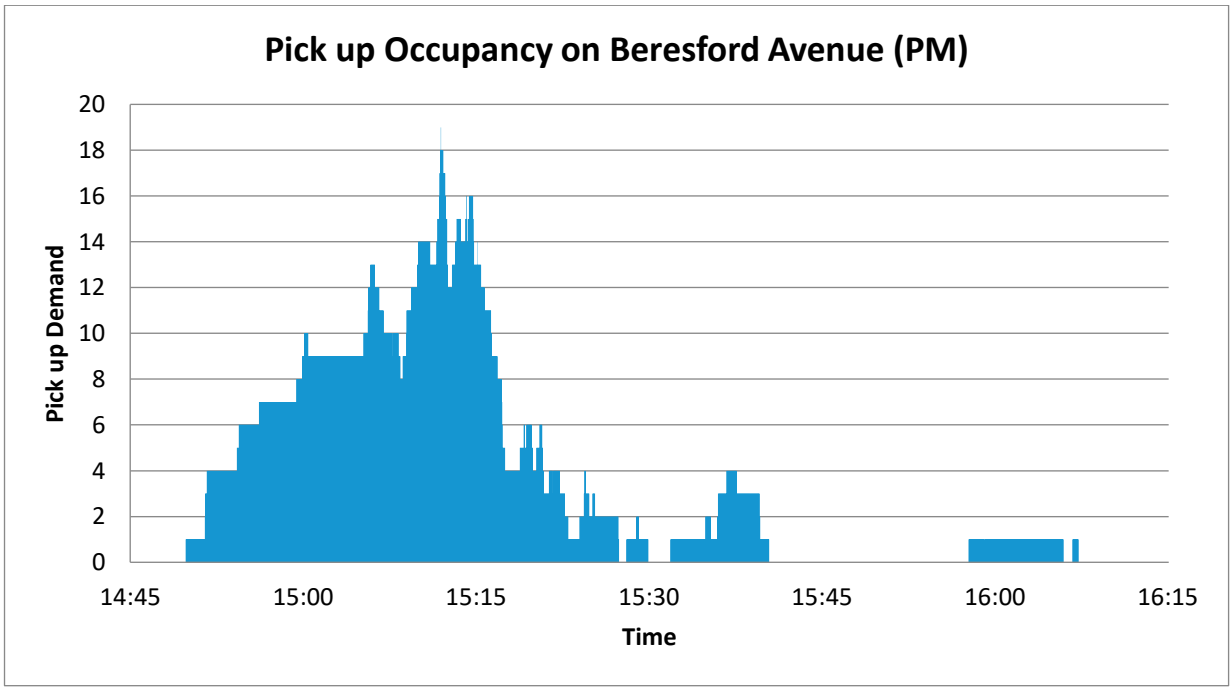


Figure 28 – Cumulative On-street Parking Occupancy on Beresford Avenue (PM)

Figure 29 and Figure 30 present the time spent along Beresford Avenue during drop off (AM) and pick up (PM) it can be seen that most of the drop off activities have quick turnarounds within 2 minutes, while the waiting time for pick up are more dispersed. In addition, the results show that the majority of parents and carers arrived in the 8:30am to 9am window for drop off and in the 3pm to 3:30pm window for pick up. This length of stay statistics support the observation that the demand for pick up spaces is far greater than for drop off spaces.

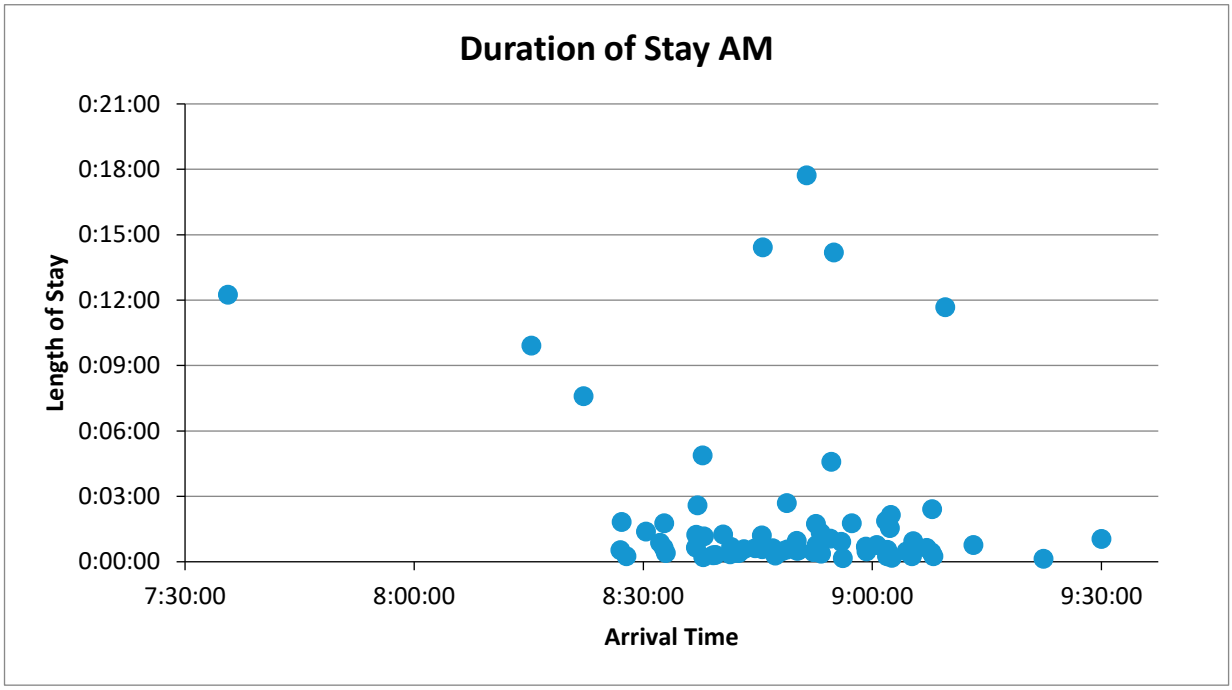


Figure 29 – Duration of Stay during Drop off (AM)

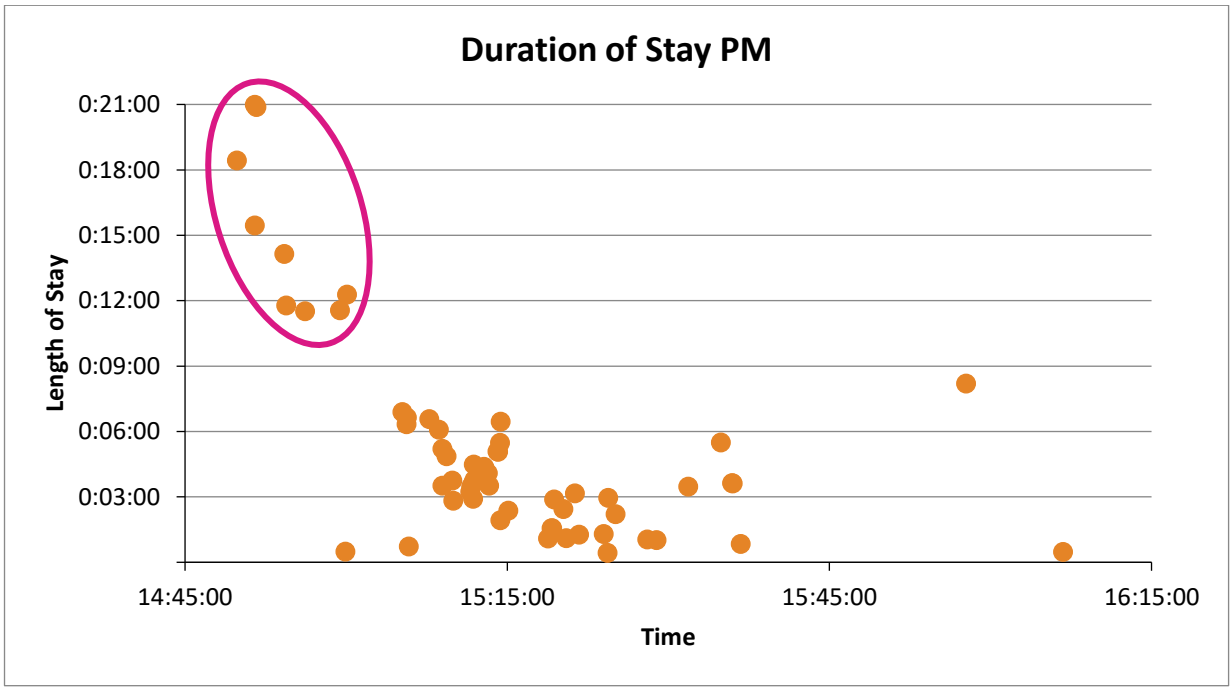


Figure 30 – Duration of Stay during Pick Up (PM)

As can be observed in Figure 29 and Figure 30, the school peak periods were from 8:30am to 9am and from 3pm to 3:30pm for drop off and pick up respectively. The average dwell times during these peak 30 minutes for the AM and PM peaks were 116s and 220s respectively.

It should be noted that when on site, some parents have been observed to park in Beresford Avenue, walk to the school and accompany their children to the car. Others arrived early, before the school finished. This can be seen from the data, where vehicles that arrived before 3pm stayed in Beresford Avenue for more

than 10 minutes (refer to the area circled in Figure 30). These vehicles were not taken into account when determining the average dwell times.

In addition to the dwell times from the back of queue, the length of stay data for the pick-up area (effectively two spaces) were also studied for the peak period (3pm to 3:30pm). The results are presented in Figure 31.

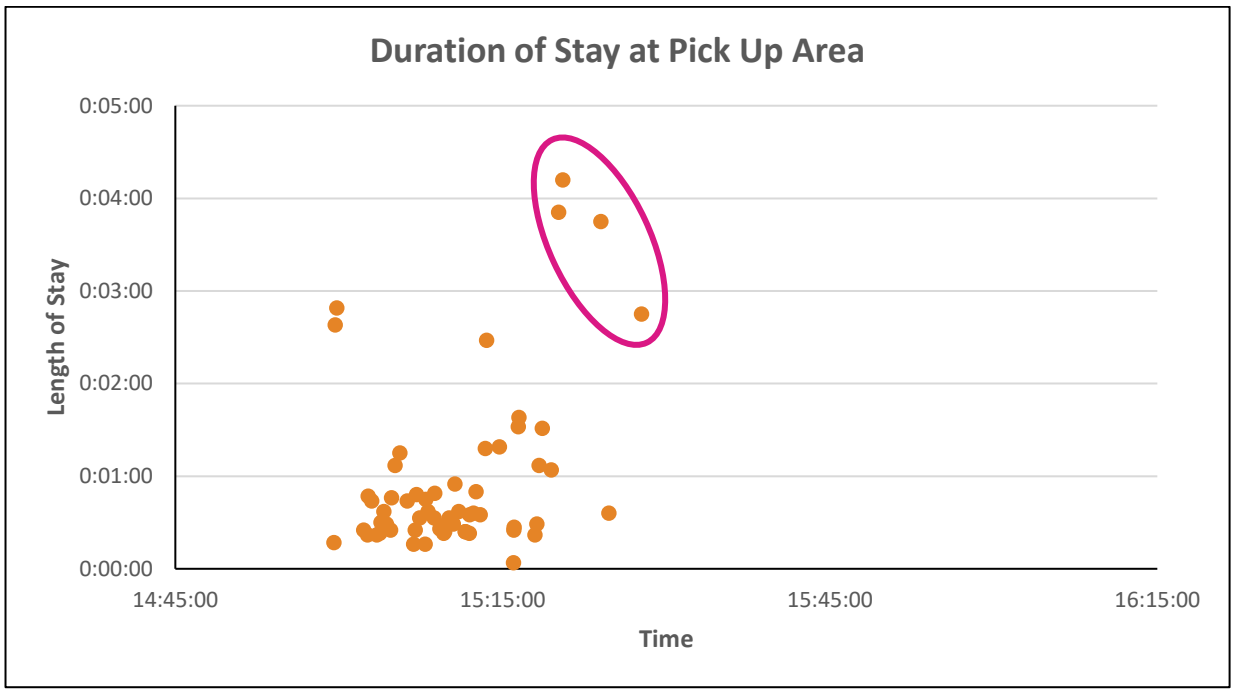


Figure 31 – Dwell Time at Pick Up Area

Circled results represent vehicles that parked in the pick-up area at the finish of the pick-up time. These vehicles do not represent an actual pick-up behaviour and therefore are not considered when calculating an average dwell time. The average dwell time at the pick-up area is 46 seconds.

The significant difference between the back of queue dwell time and the pick-up area dwell time in the afternoon is an indication for parents arriving before the school finish and waiting in Beresford Avenue as well as parents parking and walking into the school.

Overall, the school appears to have only one start and finish time, which leads to one significant spike in vehicle arrivals. If bell times were spread, i.e. 2 start and finish times in 15-30 minute intervals, or 3 start and finish times in 15 minutes intervals, the school traffic would spread over a longer period of time, but the peak would be reduced.

Another option of spreading the traffic activity is to provide before and after school care.

As these methods have not been formalised, the traffic impact assessment for the development in Section 6 is based on the existing traffic behaviours. This can be seen as the worst case scenario considering the proposed implementation of the Green Travel Plan.

5. Parking Provisions

5.1 Planning Policy Requirements

The site is identified to be under Canterbury Bankstown Council's *Bankstown Local Environment Plan 2015*. In establishing the parking provision requirements, reference is made to the *Bankstown Development Control Plan 2015* (DCP). The following sections outline the minimum parking requirements for the proposed school expansion.

5.2 Drop-off and Pick-up Analysis

In order to model future drop-off and pick-up demand, the following assumptions and considerations have been made:

- As a means of providing a conservative assessment of the future road network, it is assumed that future drop-off and pick-up behaviours and mode shares will occur with the same ratio as they do currently. This is considered to be a conservative approach for the following reasons:
    - The drop-off and pick-up activity based on the online survey results is higher than observed on site. Nevertheless, the rates from the online surveys are used to calculate post development traffic;
    - Factors such as car occupancy are likely to change with an increased student population from the same catchment area, which will likely reduce car usage. However, this has not been taken into consideration;
    - With the implementation of the Green Travel Plan measures, it is possible that the car usage will drop, as more students may decide to walk or cycle to and from school;
- It can be assumed that some parents will continue arriving to school for pick-up some time before the school finish. The number of these parents is prorated based on the student number increase;
- It is assumed that parents who drop-off and pick-up at locations other than Beresford Avenue or Davis Lane will continue to do so post development;
- All parents need to be educated to enter the school for drop-off and pick-up from Beresford Avenue, as otherwise conflicts will occur between vehicles undertaking U-turns and vehicles coming out from the school. The school should strongly discourage parents from undertaking drop-off and pick-up activities on Davis Lane. For the purpose of this report, all vehicles currently undertaking drop-off and pick-up at Davis Lane and Beresford Avenue will be assumed to use the new drop-off and pick-up lane off Beresford Avenue;
- It is recommended to dedicate some spaces as a "Park and Walk" arrangement for parents who wish to accompany their children. It is proposed to change the current signage along Beresford Avenue from a "Drop off and Pick up only" area to "15P" during school peak times.
- It should be noted that the following calculations are based on the existing behaviours and therefore can be seen as the "worst case scenario". Proposed future implementation of programs are briefly discussed in Section 5.2.4 and in the Green Travel Plan prepared by ptc. on 24/09/2020.

5.2.1 Future number of Students Travelling by Car

The proposed numbers of students that are anticipated to travel to and from school by car post development are shown in Table 5.

Table 5 – Proposed Vehicle Numbers during Drop-off and Pick-up

Total No. Students	No. Students arriving / departing by car	No. Vehicles	Drop-off / Pick-up location		No. Vehicles at locations
AM Drop-off					
644	62% (arr. with parents) + 9% (arr. with other family) = 71% (arriving by car) => 457 students	1.79 (car occupancy) => 256 vehicles	On-Site	57.4% (old Beresford A.) + 17.2% (old Davis Ln) = 74.6%	191
			Other	25.4%	65
				TOTAL:	256
PM Pick-up					
644	61% (dep. with parents) + 7% (dep. with other family) = 68% (departing by car) => 438 students	1.8 (car occupancy) => 243 vehicles	On-Site	56.1% (old Beresford A.) + 23.7% (old Davis Ln) = 79.8%	194
			Other	20.2%	49
				TOTAL:	243

5.2.2 Required and Proposed Number of Drop-off and Pick-up Spaces

As pick-ups are observed to have a significantly higher dwell times than drop-offs, it is the afternoon period that determines the required number of parking spaces. The calculation is based on the following factors:

- 194 vehicles will undertake pick-up within the school grounds in the afternoon (refer to Table 5);
- All pick-ups will occur within a 30 minutes period;
- Semi-assisted pick-up dwell time is 46 seconds (refer to Section 4.3).

Using a model based on a Poisson distribution, the semi-assisted pick-up activity requires 8 bays, which has a probability of 10% to result in a 1 car queue.

It should be noted that this calculation assumes that vehicles start arriving when students are ready for pick-up. As discussed in Section 4.3, a number of vehicles arrived before the school finish at Beresford Avenue and it is anticipated that this trend will continue in the future. In order to account for this behaviour, the current number of early arrivals of 9 is prorated, which equates to 30 vehicles, and is added on to the queuing length required to cater for the school.

Considering the above, the required length of the pick-up area is calculated as follows:

8 bays dedicated to pick-up + 1 vehicle likely to queue based on the Poisson distribution + 30 early arrivals = 39 vehicles.

Assuming a vehicle length of 6 metres, 234 metres of waiting area is required. As shown in Figure 32, there is approximately 250m of possible queuing length on-site before the queue reaches Beresford Avenue. Based on this, the proposed layout can accommodate the anticipated pick-up and drop-off demand.

In addition to this, it is proposed to change the current "Pick-up and Drop-off" restriction along Beresford Avenue to P15, as a means to designate these spaces to parents who wish to accompany their children to and from the school (refer to the green section shown in Figure 32). This section is approximately 100m long and allows for 17 vehicles to park without interfering with vehicles coming in and out of the new driveway. This "Park and Walk" area should be restricted to school peak times, after which the spaces become unrestricted, as per the existing arrangement.

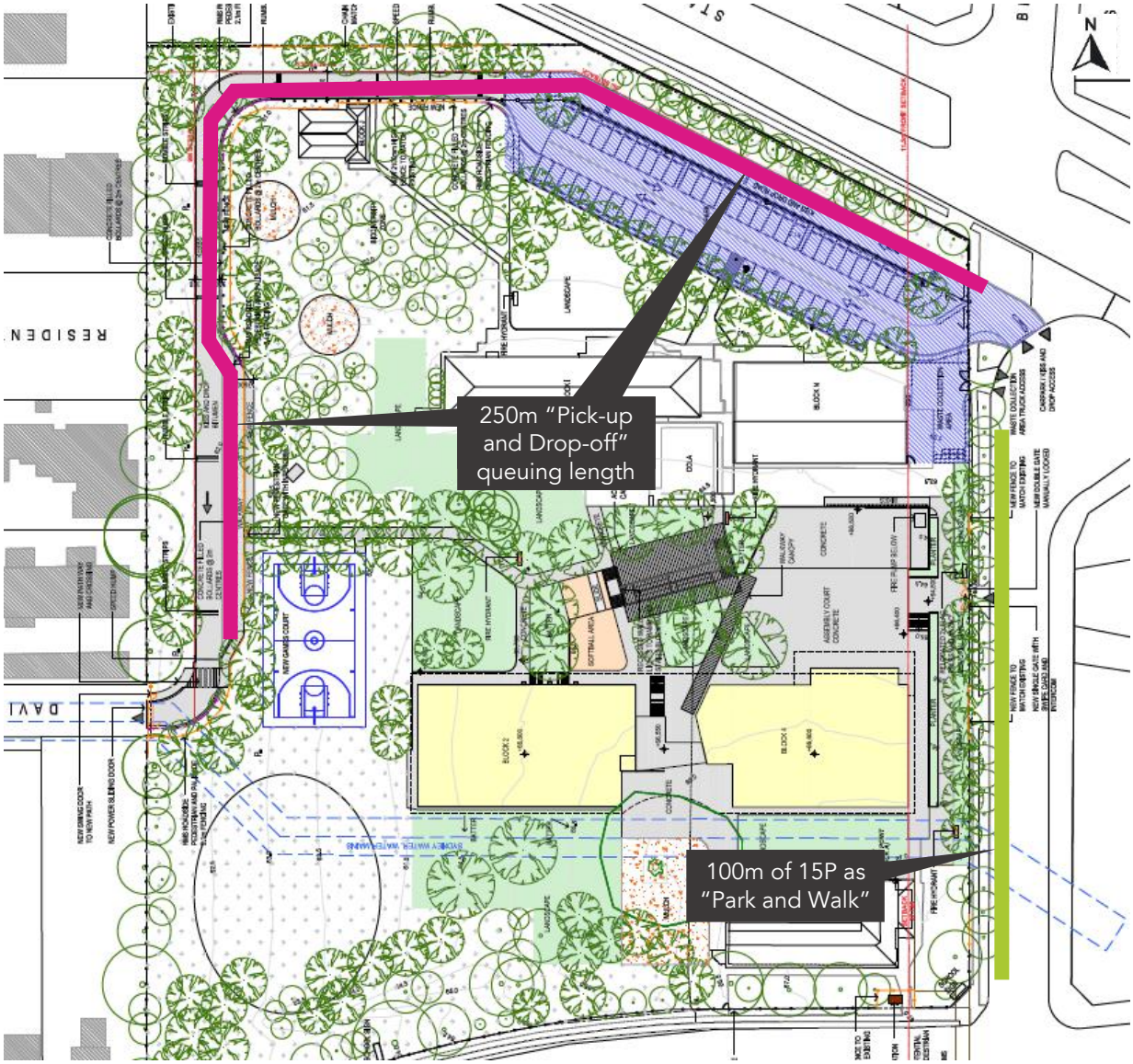


Figure 32 – Queuing Length within the Site

5.2.3 Drop-off and Pick-up Operation

Currently, there is one staff member with a microphone calling out the number displayed on the dashboard of a vehicle that has arrived at either of the two designated pick-up and drop-off spaces. Second staff member locates the correspondent student and helps it get into the car.

In order to achieve a similar level of management post development, it is proposed to allocate one staff member to read out the student number and another staff member per two to three pick-up and drop-off

spaces to assist students. With eight proposed pick-up and drop-off spaces, the school would require to allocate four to five staff members in the afternoon to manage the pick-up process.

5.2.4 Possible Traffic Mitigating Measures

The following mitigation measures will help improving traffic generation and parking demand around the school:

- By parents arriving early, for pick-up in particular, the required queuing length increases disproportionally to the number of total vehicles. Therefore, repeated parent education about correct pick-up and drop-off behaviour, including arrival time management, can improve traffic congestion in the afternoons. In support of this, the school gates could open only 5 minutes before the bell rings;
- Implementation of staggered bell times would increase the time period of pick-up and drop-off and reduce the peak traffic generation. Assuming an equal spread of students between staggered bell times, 2 starting / finishing times at 15-30 minutes intervals could potentially halve the peak traffic generation;
- Implementation of before and after school activities / care, in particular for those waiting for siblings or students to co-share a car ride.
- Separation of "Pick-up / Drop-off" from "Park & Walk" will also lead to a smoother and safer process as parked vehicles will not block queuing vehicles and no overtaking will occur.

5.3 Car Parking

The minimum car parking rates for schools as stipulated in Part B7, Section 4.19 of the DCP are as follows:

- 1 car space per employee or classroom, whichever is the greater; and
- 1 car space per 8 students in year 12.

Bankstown North Public School is a primary school and does not require car parking space for students.

In regard to car parking provision for staff, the following considerations have been made:

- As the future number of staff is not known yet, reference has been made to historic data regarding the ratio between the full time equivalent (FTE) teaching staff and full time equivalent students;
- It is assumed that the student headcount equals full-time equivalents and an "employee" in the DCP refers to a full-time equivalent staff member;
- The average Student FTE to Staff FTE ratio in Government Primary Schools in New South Wales over the past 10 years was 15.6, according to acara.edu.au;
- No information was found on the provision requirement of non-teaching staff, therefore the future number is prorated based on proposed student numbers. Currently the school employs 2.9 FTE non-teaching staff, according to myschool.edu.au.

Table 6 – Proposed Number of Staff

No. Students	Proposed No. FTE teaching staff	Proposed No. FTE non-teaching staff	Proposed total No. FTE staff	Parking Requirement	Parking Provision
644	**644 / 15.6 = 41.3 FTE teaching staff**	**2.9 / 330 x 644 = 5.7 FTE non-teaching staff**	**47 FTE staff**	**47**	**56**

The development application proposes to provide 56 car spaces across the ground level of the new car park and therefore meets parking requirements outlined in the DCP.

In regard to on-street parking provision in the vicinity of the site, on Hume Highway, Stacey Street and partially on Rookwood Road there is no parking. Davis Lane provides a limited number of parking spaces on the northern side of the carriageway. Beresford Avenue has a restricted "Pick-up and Drop-off" area on the western side of the carriageway and "No Stopping" during the afternoon pick-up. Rookwood Road between Davis Lane and Stacey Road as well as the residential areas to the west provide unrestricted parking.

The access to the car park will be restricted to registered users only and will be controlled by an intercom and/or a key-card.

Strategies to encourage staff to use public transport and car share are discussed in the Green Travel Plan prepared by ptc. on 13/07/2020.

5.4 Accessible Car Parking

In regard to the accessible parking, the DCP refers to the parking requirements compliant to *Building Code of Australia* and *Australian Standard 1428 Parts 1 to 4 – Design for Access and Mobility*. Schools are categorised as a Class 9b facility in accordance with Part A3.2 of the BCA (2016). Following this, the minimum parking provision requirements applicable to Class 9b building as outlined in Table D3.5 of BCA is as follows:

- 1 space for every 100 car parking spaces or part thereof.

Hence a car park of 56 spaces will require one (1) accessible parking space. In response, one (1) accessible car space has been provided, which meets the minimum accessible parking requirement.

5.5 Bicycle Parking

The DCP does not provide bicycle parking rates for educational establishments. Nevertheless, the development proposes to provide a total of 48 bicycle racks for staff and students. As discussed earlier, the school is positioned between three state roads and the cycle infrastructure in the vicinity is poor. However, with the implementation of infrastructure improvements and programs discussed in the Green Travel Plan prepared by ptc. on 13/07/2020, some students are anticipated to take up cycling.

The school is also proposing to provide some pedestrian scooter storage areas to further increase the attractiveness of alternative transport modes.

6. Traffic Impact Assessment

6.1 Existing Traffic Conditions

In order to determine the existing traffic conditions within the road network serving the School, traffic count surveys were undertaken on Thursday, 7th November 2019 between 7am and 9am as well as between 2:30pm and 6:00pm at the following intersections:

- Stacey Street / Hume Highway;
- Stacey Street / Beresford Avenue;
- Stacey Street / Rookwood Road;
- Rookwood Road / George Street / Davis Lane;
- Hume Highway / Rookwood Road / Chapel Road;
- Hume Highway / Beresford Avenue;

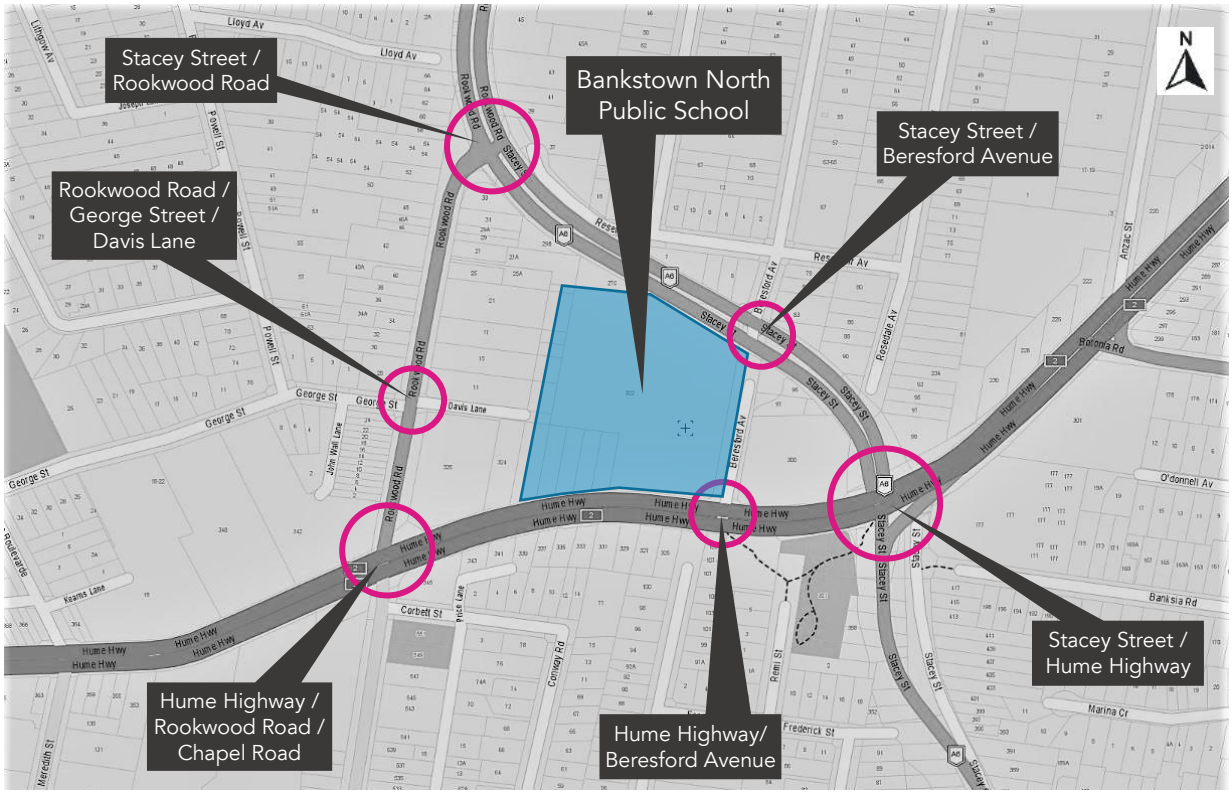


Figure 33 – Surveyed Intersections

The six intersections were studied as a network and the AM and PM peak hours were identified to be from 7:15am to 8:15am and from 4:30pm to 5:30pm respectively. It should be noted that the network peak hours are not aligned with the school drop off / pick up peak hours (8:15am to 9:15am and 2:45pm to 3:45pm) which cover 96% and 97% of the vehicular movements. In order to study the traffic impact of the school traffic, the school peaks are adopted in the traffic analysis where applicable. It should be noted that the intersection survey spanned between 7am and 9am in the morning and therefore does not cover the 15 minute interval from 9am to 9:15am. Thus, the traffic volumes from 8am to 9am were taken instead for the analysis. The results of the intersection surveys are illustrated in the following figures:

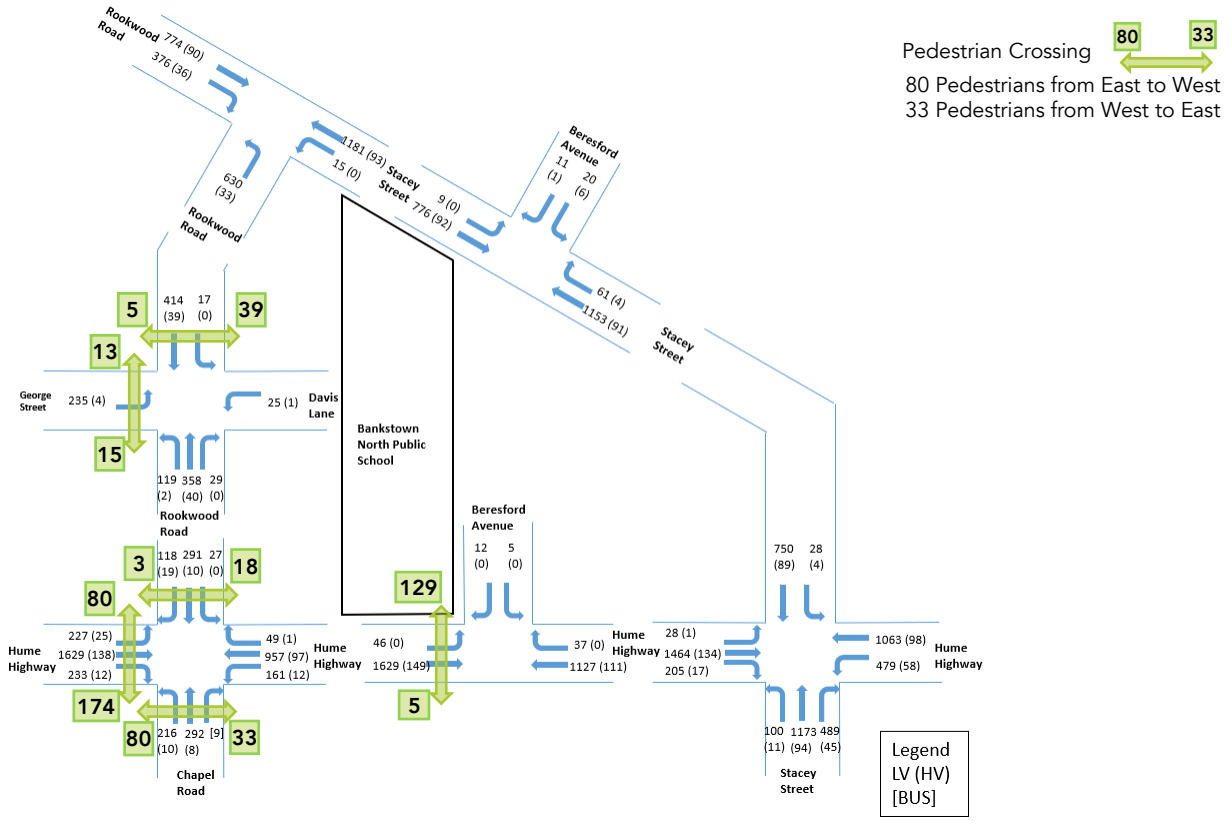


Figure 34 – Existing AM School Peak Traffic Volumes (8am to 9am)

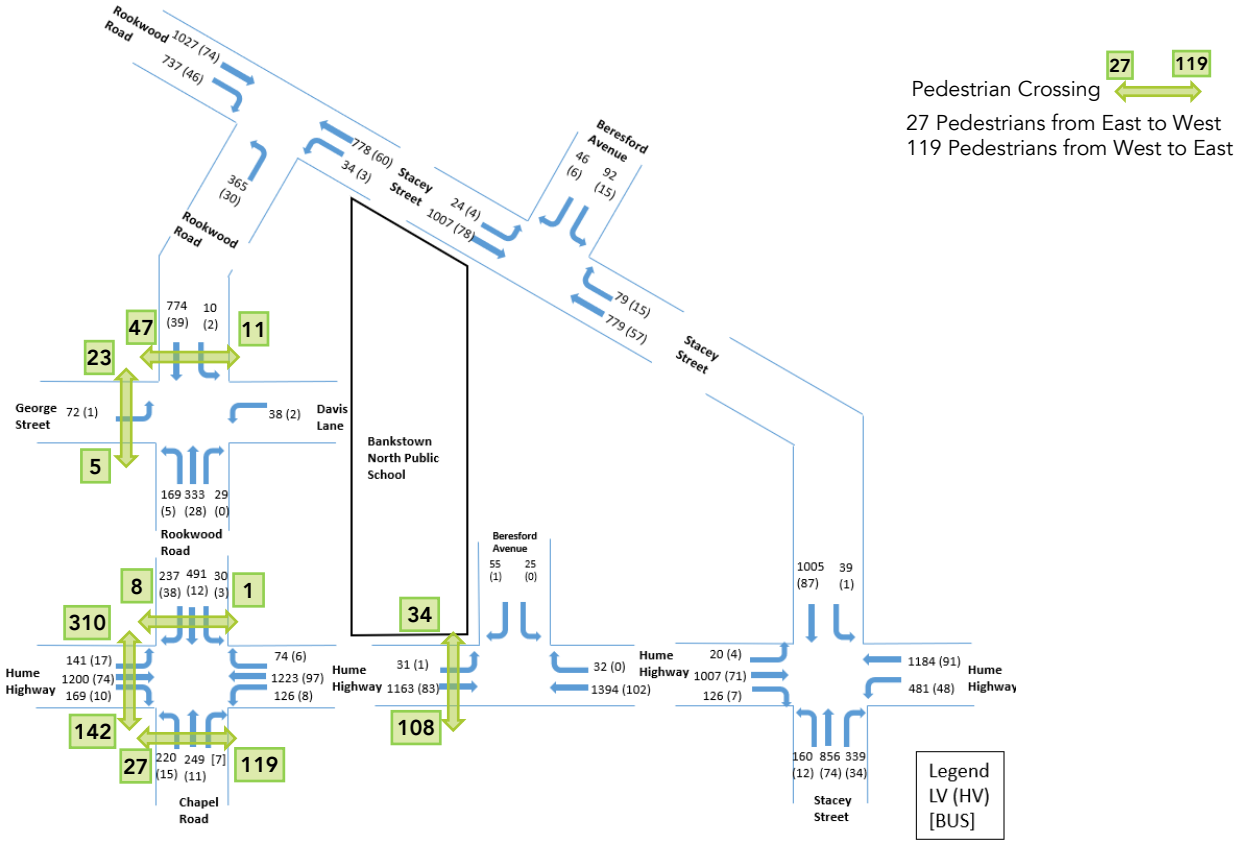


Figure 35 – Existing PM School Peak Traffic Volumes (2:45pm to 3:45pm)

6.2 Future Intersection Arrangements

Through discussions with TfNSW (refer to the *Stakeholder Consultation Report* prepared by DFP dated 28th August 2020), it is understood that TfNSW is planning to undertake modifications to the road network surrounding BNPS as part of future upgrades to the road network. The modifications significant to this project are as follows.

6.2.1 Hume Highway / Beresford Avenue Intersection

Hume Highway / Beresford Avenue is a signalised T- intersection with Hume Highway traversing east-west and Beresford Avenue traversing towards the north. Currently, all through and turn movements are permitted. In conjunction with the planned upgrades to the Hume Highway and Stacey Road intersection[3], TfNSW has proposed to eliminate all right movements at the Hume Highway / Beresford Avenue intersection and are considering the provision of an overhead pedestrian bridge in the north-south direction. It is understood that these changes were proposed as a means to removing a set of traffic signals and thereby easing the traffic flow at the adjacent intersections.

It is noted that the right turn bans will have an effect on the school traffic movements, but all development stakeholders support the RMS proposed changes to traffic conditions. The RMS project (Stacey St and Hume Hwy Bankstown upgrade) is seen as a benefit to the school, as it will provide a safe passage for students residing south of the highway.

6.2.2 Rookwood Road / George Street / Davis Lane Intersection

Rookwood Road / George Street / Davis Lane intersection is a four – arm intersection, with Rookwood Road traversing north-west, George Street traversing towards the west and Davis Lane traversing towards the east. Currently, Rookwood Road and George Street are signalised, whereas, Davis Lane does not operate under the signals. Also, all turn movements are allowed from the southern arm of Rookwood Road, through and left turn movements are allowed from the northern arm of Rookwood Road, only left turn movements are allowed from George Street and only left turn movements are allowed from Davis Lane.

It is understood that as part of future modifications, TfNSW is planning to signalise the Davis Lane arm and allow for through movements from Davis Lane into George Street as a means to reduce the impact on the Hume Highway. Part of the upgrade would also involve the inclusion of pedestrian crossings at the Davis Lane and southern Rookwood Road approaches.

The development stakeholders support this arrangement and are proposing to work with the authorities to expedite these works.

These intersection arrangements have been taken in consideration when undertaking modelling for the future development traffic.

6.2.3 Interim Solutions

The timing of the TfNSW road upgrades has not been determined yet; therefore, as an interim solution for the Hume Highway / Beresford Avenue intersection, the project is proposing to work with the authorities to implement a staggered pedestrian crossing with a holding area at the median of the Hume Highway. This is beneficial for the following reasons:

[3] https://www.rms.nsw.gov.au/projects/stacey-st-hume-highway-bankstown/index.html

- A staggered pedestrian crossing would encourage the school community living within 1.2km to the south of the Hume Highway to walk to school; and
- The removal of all right turn movements aligns with TfNSW's future plans, as it improves the vehicular flow.

The total green phase for pedestrians should be increased from the current 20 to 25-28 seconds, instead of a total of 30 seconds for vehicles, to allow for more crossing time for the young students. The staggering of pedestrian green phases would reduce the red phase for the individual through movements along the Hume Highway.
The changes that would be required are conceptually shown in Attachment 2.

6.3 Development Traffic

With the proposed increase of student population from 330 students to 644 students by Year 2026, additional traffic associated with the school activities will be generated, which is presented in the following sections.

6.3.1 Private Vehicles – Future Students

As described in Section 4.1.1, an online questionnaire has been conducted in November 2019 to explore the existing student/parent travel behaviours. The questionnaire received 170 responses in total which is a good sample size to the population of 330 students. The questionnaire has identified several key travel characteristics such as car mode shares, average occupancy, locations of drop off / pick up. The location of residence was derived based on actual student location data. It is assumed that the travel behaviours of the proposed increase of 314 students will follow the existing trend, while taking in consideration future intersection arrangements as described in Section 6.2.

The additional car trip generation due to student/parent drop off and pick up are tabulated in Table 7.

Table 7 – Student/Parent Car Trip Generation

Peak Hour	Increase of Student Numbers	Mode Share – Car	Average Occupancy	Car Trip Generation
AM	314	71.8%	1.78	127
PM		67.1%	1.80	117

An implementation of staggered bell times would increase the time period of pick-up and drop-off and reduce the peak traffic generation. Assuming an equal spread of students between staggered bell times, 2 starting / finishing times at 15-30 minutes intervals would halve the peak traffic generation. However, the following calculations are based on the existing behaviours and therefore can be seen as the "worst case scenario".

When undertaking an analysis of the future traffic distribution, the following considerations have been made. As discussed in Section 4.1.1, the residence of students was derived from the actual student location data. Based on these areas, assumptions were made which of the two major roads are likely to be used when travelling to / from school from / to the individual places of residence. A diagram of the assumed distribution is shown in Figure 36. The individual trip numbers based on the above assumptions are summarised in Table 8.

Figure 36 – Assumed Student Traffic Distribution

Table 8 – Assumed Student/Parent Trip Distribution

		Peak Hour	North-West (21.8%)	South-West (68.3%)	East (9.9%)	Total Inbound	Total Outbound
Place of Residence		AM	27	87	13	127	127
		PM	25	80	12	117	117
Stacey Street (SS)	North of SS	AM	4 (inbound)	-	-	4	-
		PM	4 (inbound)	-	-	4	-
	South of SS	AM	-	43 (inbound)	13(inbound) 11 (outbound)	56	11
		PM	-	40 (inbound)	12(inbound) 10 (outbound)	52	10
Chapel Road (outbound only)	South of HH	AM	-	65(outbound)	-	-	65
		PM	-	60(outbound)	-	-	60
George Street (outbound only)	West of Rookwood Road	AM	27(outbound)	-	-	-	27
		PM	25(outbound)	-	-	-	25
Hume Highway (HH)	West of HH	AM	23(inbound)	44(inbound) 22(outbound)	-	67	22
		PM	21(inbound)	40(inbound) 20(outbound)	-	61	20
	East of HH	AM	-	-	2(outbound)	-	2
		PM	-	-	2(outbound)	-	2

With the proposed changes to the pick-up and drop-off location, the following considerations have been made. It is acknowledged that some students are currently picked up and dropped off from other locations, such as Jacobs Street or Hume Highway. However, for conservativeness, it is assumed that all future school related inbound trips will occur via Beresford Avenue. For exiting vehicles, the majority of vehicles will exit via Davis Lane. However, it is taken into consideration that some parents will use the "Park and Walk" area along Beresford Avenue, turn around and exit from there. Based on the online surveys, 8.2% of students are always and 26.2% sometimes accompanied by their parents. For the purpose of this report it is assumed that 10% of the future trips will enter and exit via Beresford Avenue, and 90% will enter via Beresford Avenue and exit via Davis Lane. The number of trips accessing via these roads are summarised in Table 9.

Table 9 – Drop off / Pick up Location for Future Students

	Peak Hour	Entry and Exit via Beresford Avenue	Entry via Beresford Avenue Exit via Davis Lane
Additional Parent / Student Trips depending on different Drop off / Pick up Location	**AM**	**10%**	**90%**
	PM	**10%**	**90%**
	AM	**13**	**114**
	PM	**12**	**105**

The pick-up and drop-off trip distribution for future students is visualised in Figure 37 and Figure 38.

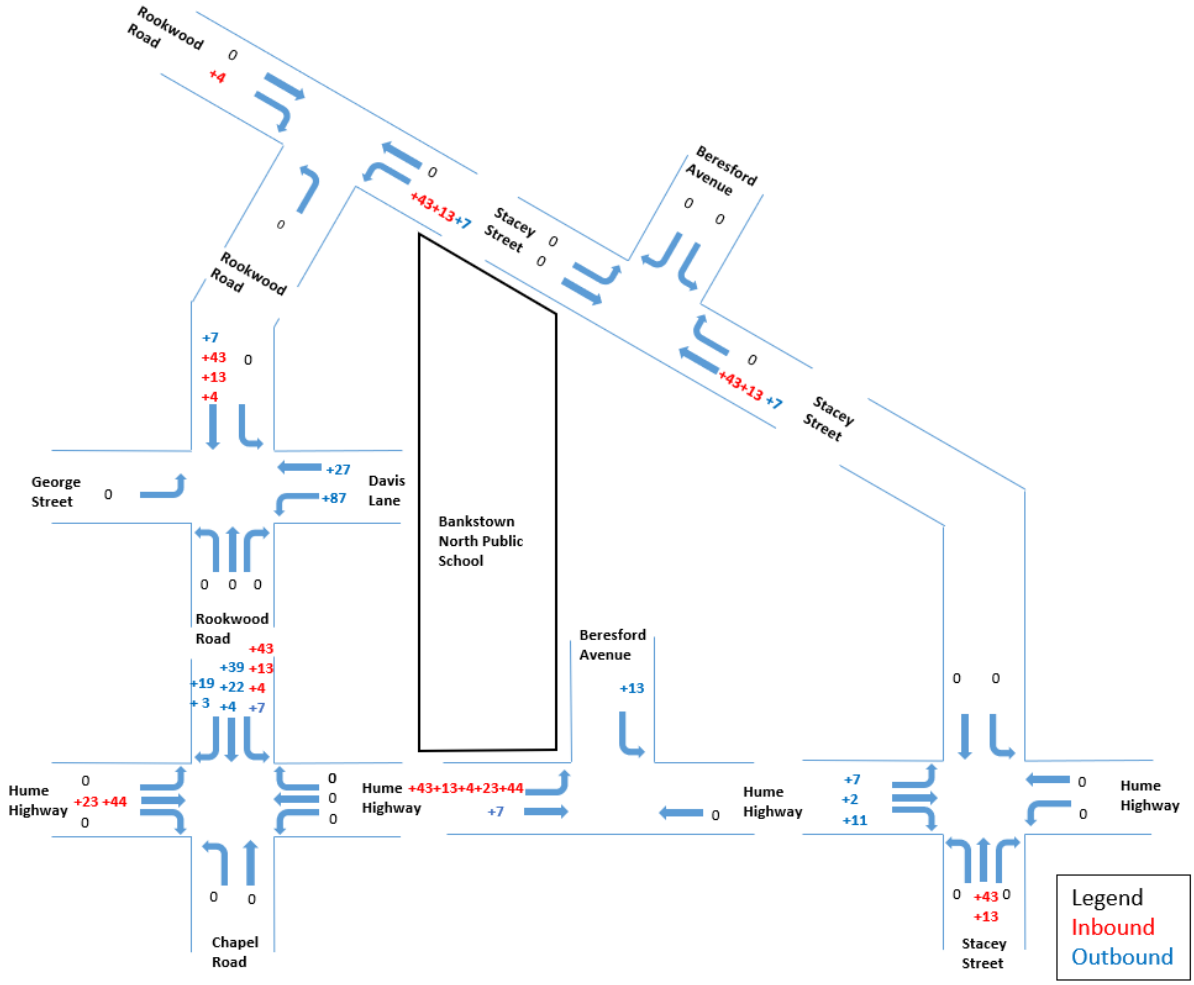


Figure 37 – Future Parent / Student Drop off Trip Distribution (AM)

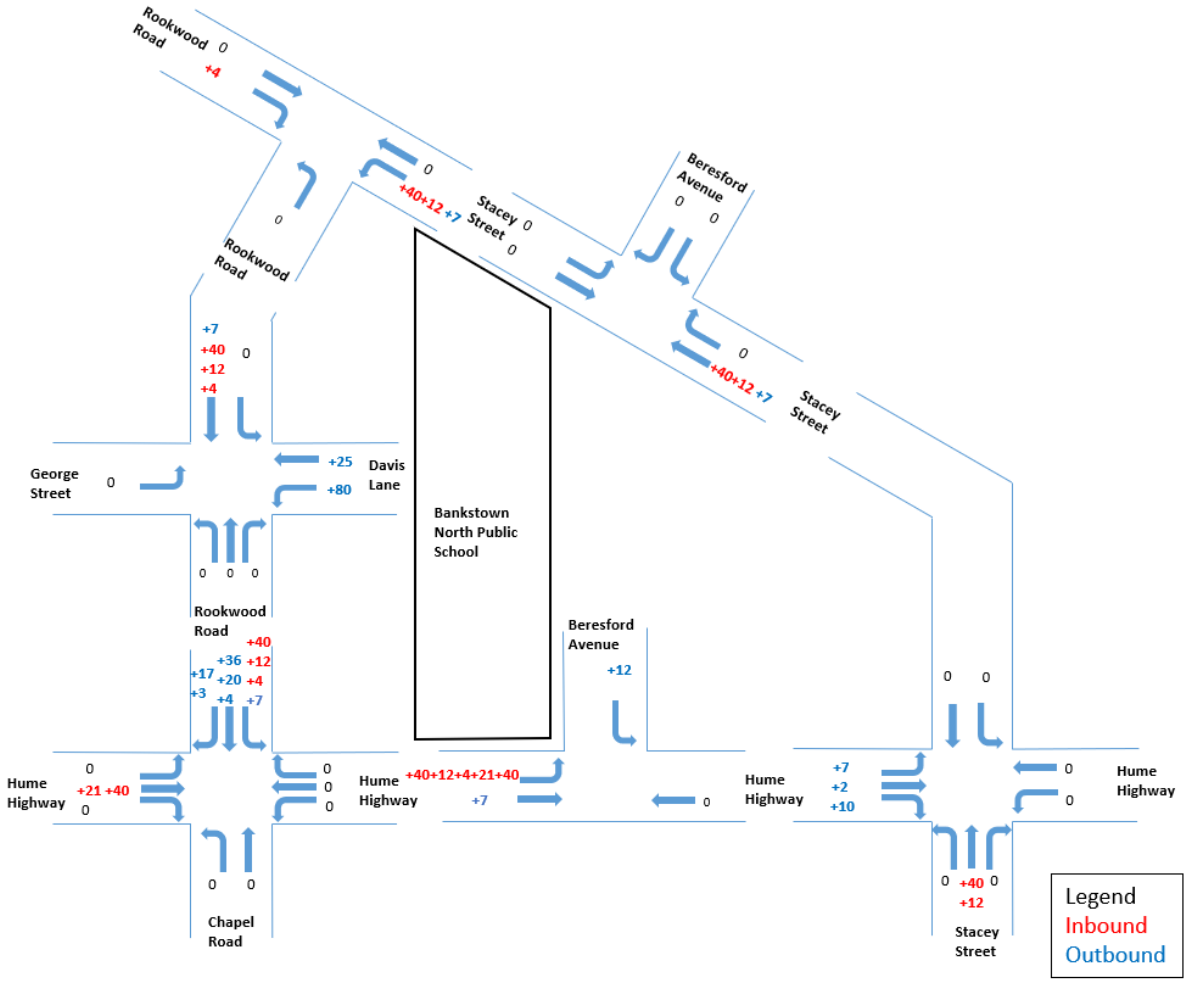


Figure 38 – Future Parent / Student Pick up Trip Distribution (PM)

6.3.2 Private Vehicles – Existing Students

With the proposed changes to the pick-up and drop-off arrangement, the trip distribution for the existing students will change in the future. The following considerations have been made. Currently, 25.4% and 20.2% of students in the morning and afternoon respectively undertake the pick-up and drop-off activity at other locations than Beresford Avenue or Davis Lane. It is assumed that this trend will continue in the future, therefore these trips will not be adjusted.

As to Davis Lane and Beresford Avenue, they currently are cul-de-sacs, meaning that there is the same amount of inbound and outbound trips from either of these roads. As the proposed pick-up and drop-off arrangement is a one-way road, the existing trips will need to be changed as follows: the current inbound trips into Davis Lane will occur via Beresford Avenue in the future, and current outbound trips from Beresford Avenue will occur via Davis Lane.

The trips that need to be adjusted due to the changed arrangement are summarised in Table 10.

Table 10 – Drop off / Pick up Location for Current Students

	Peak Hour	Beresford Avenue	Davis Lane
Existing Percentage	**AM**	**57.4%**	**17.2%**
	PM	**56.1%**	**23.7%**
Additional Parent / Student Trips Drop off / Pick up Location	**AM**	**75**	**23**
	PM	**70**	**30**

It is assumed that the parents/students entry/exit trip to Davis Lane will remain the same, while the travel pattern will change for parents/students entering via Beresford Avenue and exiting via Davis Lane. The distribution of these trips has been assumed based on the trip distribution for future students and is illustrated in Figure 39 and Figure 40 for AM and PM peak hour respectively.

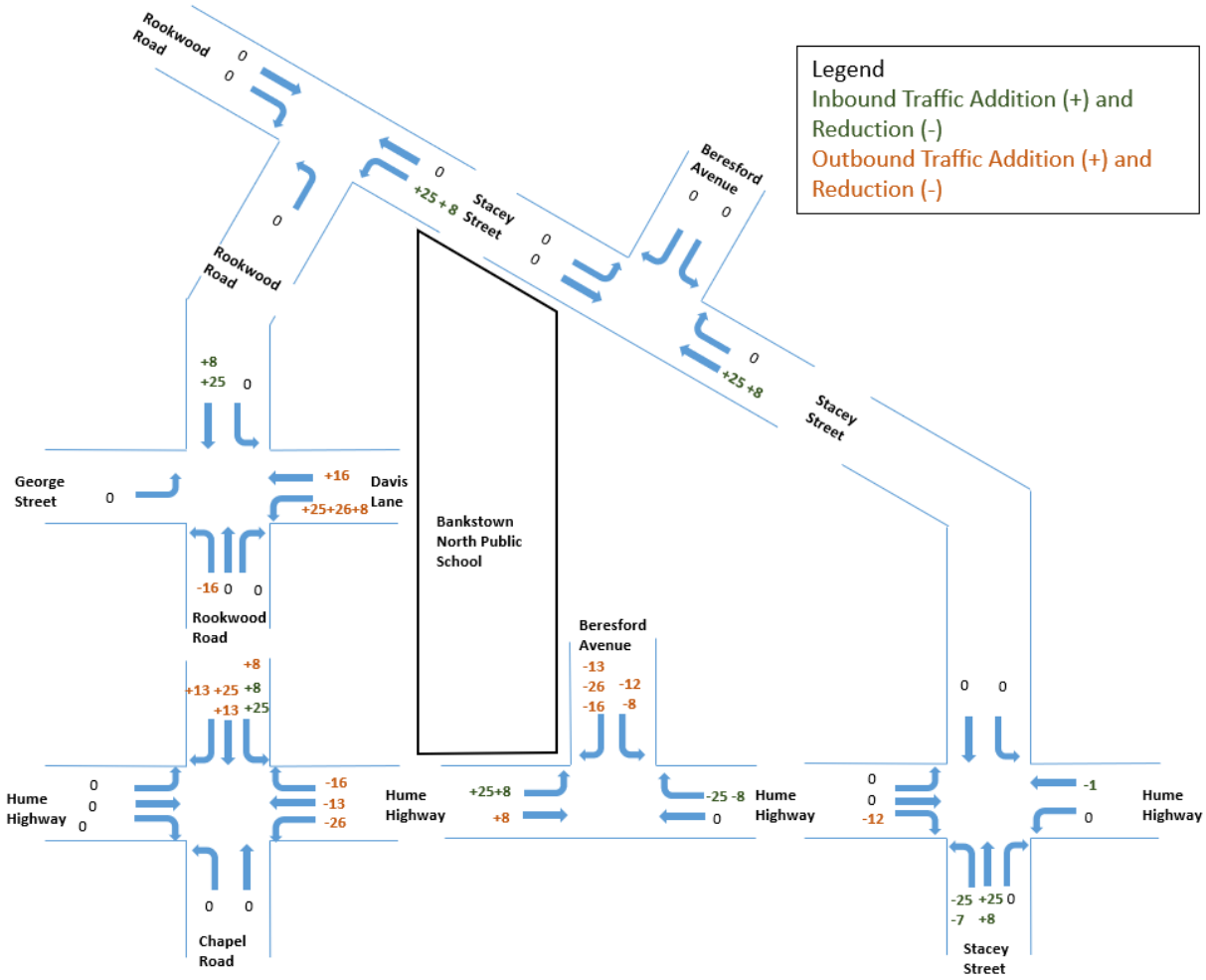


Figure 39 – Existing Parent / Student Trip Distribution Changes (AM)

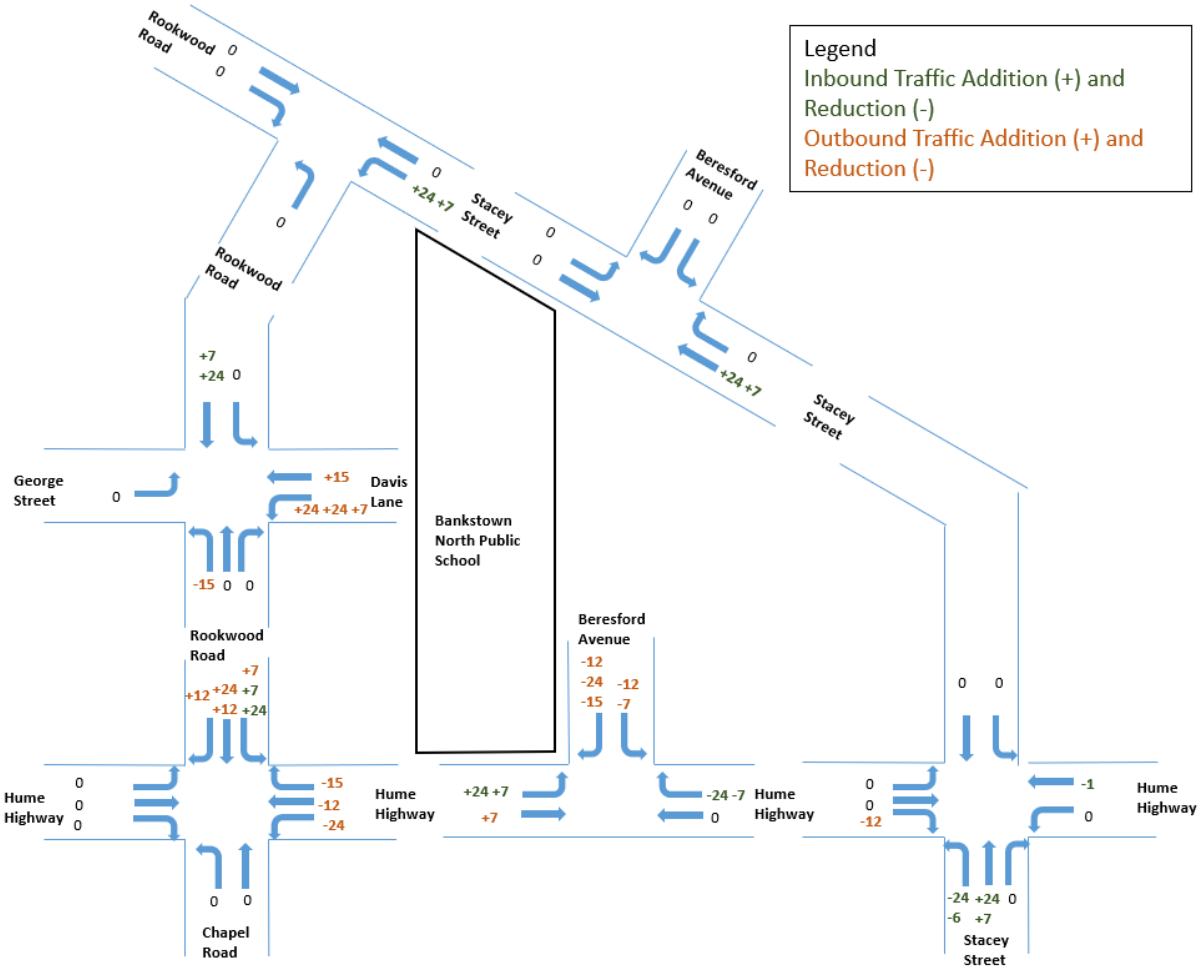


Figure 40 – Existing Parent / Student Trip Distribution Changes (PM)

6.3.3 Private Vehicles – Future Staff

The increase of 314 students over time would result in an increase in staff from 22 FTE to 47 FTE. There are currently 33 staff with a survey completion rate of 78%. Using the assumption that the ratio of staff to FTE and their travel mode split remains unchanged between the survey sample and the post development population, the 19 vehicular trips from the survey (sample) or 24 projected actual trips (population) would translate into 52 trips post development (19 trips/78% x 47/22) – a net increase of 28 trips.

It is assumed that all staff trips will park within the new car park, as per the existing. As the car park entry will be retained off Beresford Avenue, the trip distribution for staff is assumed to remain the same in the future.

Furthermore, average staff arrival and departure at the school peak hours, i.e. 8:15am-9:15am and 2:45pm-15:45pm are determined to be 24.8% in the morning and 2.9% in the afternoon, which equates to 7 trips and 1 trip respectively.

The assumed staff trip distribution is shown in Figure 41.

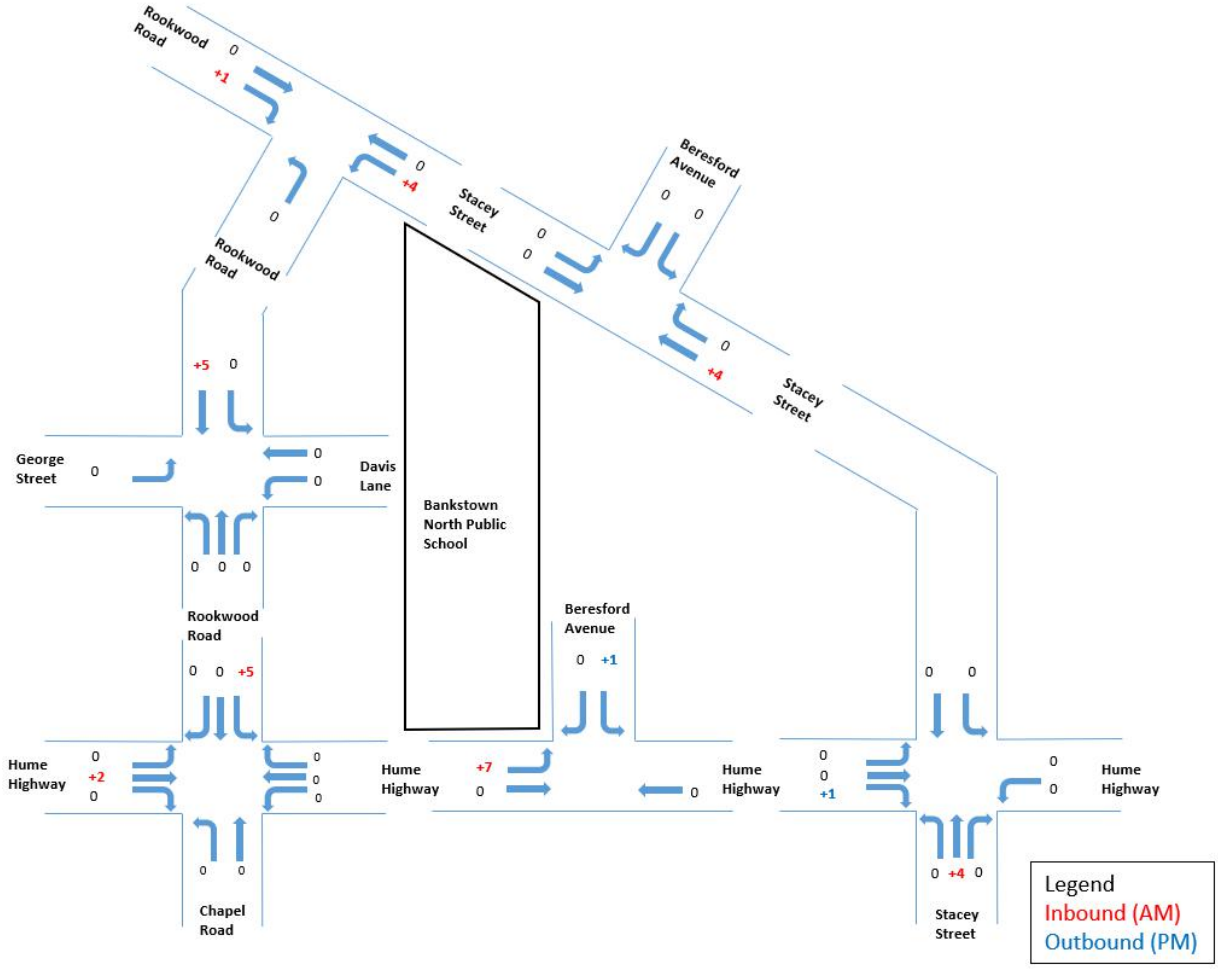


Figure 41 – Staff Trip Distribution during the School Peaks

6.3.4 Service Vehicles

Waste collection vehicle movements will occur during mid-day off-peak periods and will not impact the peak hour traffic flow.

6.4 Pedestrian Movements

The directional split of students walking to school is obtained from the depersonalised data and presented in Figure 42.

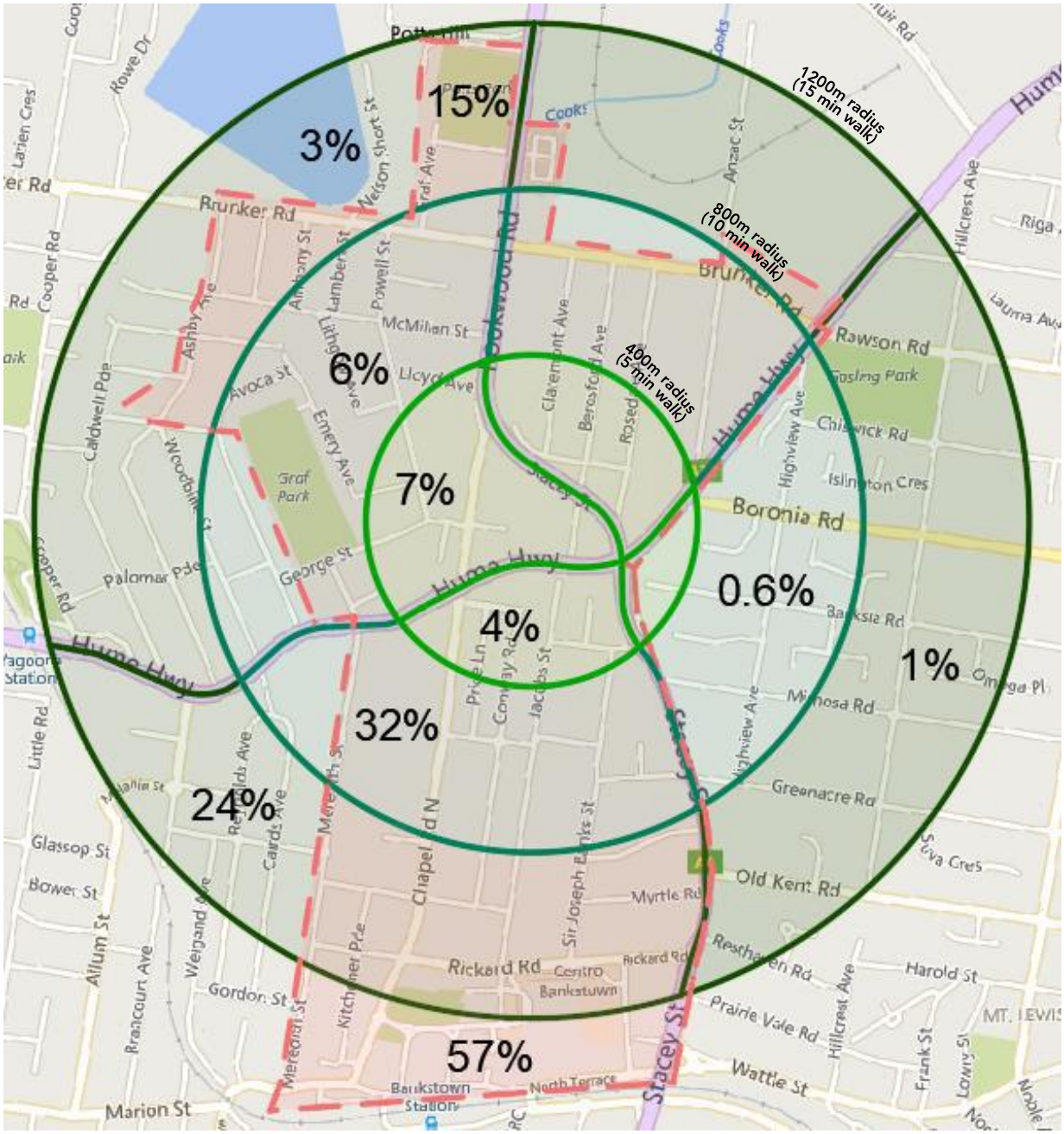


Figure 42 – Walking Desire Lines

From the information we can see that 60% students live within walking catchment on the south of the Hume Highway and 16% live within walking catchment on the north of Hume Highway. In order to calculate the number of walking students out of the total students, percentages of walking students are pro-rated based on the walking catchment. Hence, it is assumed that out of the total number of students, 78% students could walk from the south of Hume Highway and 22% could walk from the north of Hume Highway. A diagram of the assumed pedestrian distribution is shown in Figure 43.

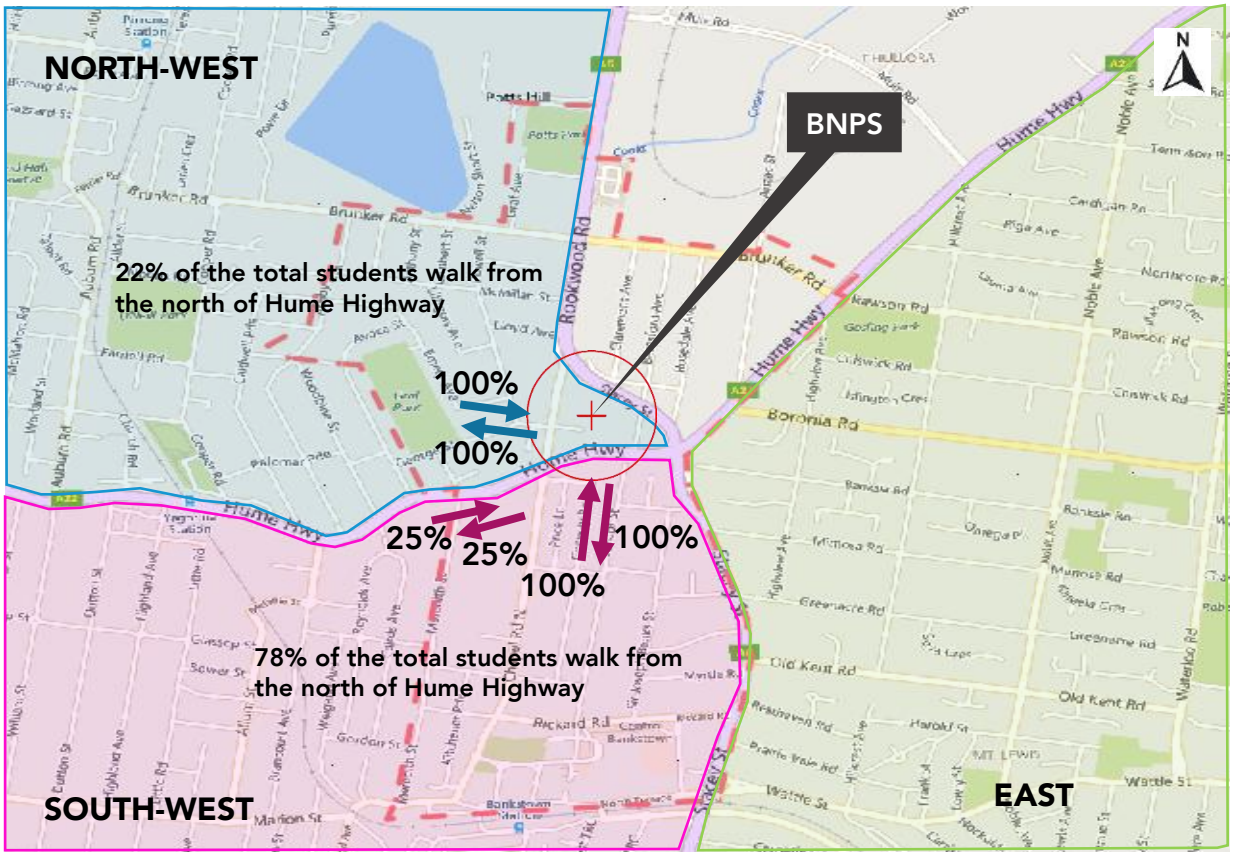


Figure 43 – Assumed Pedestrian Traffic Distribution

6.4.1 Existing Pedestrians

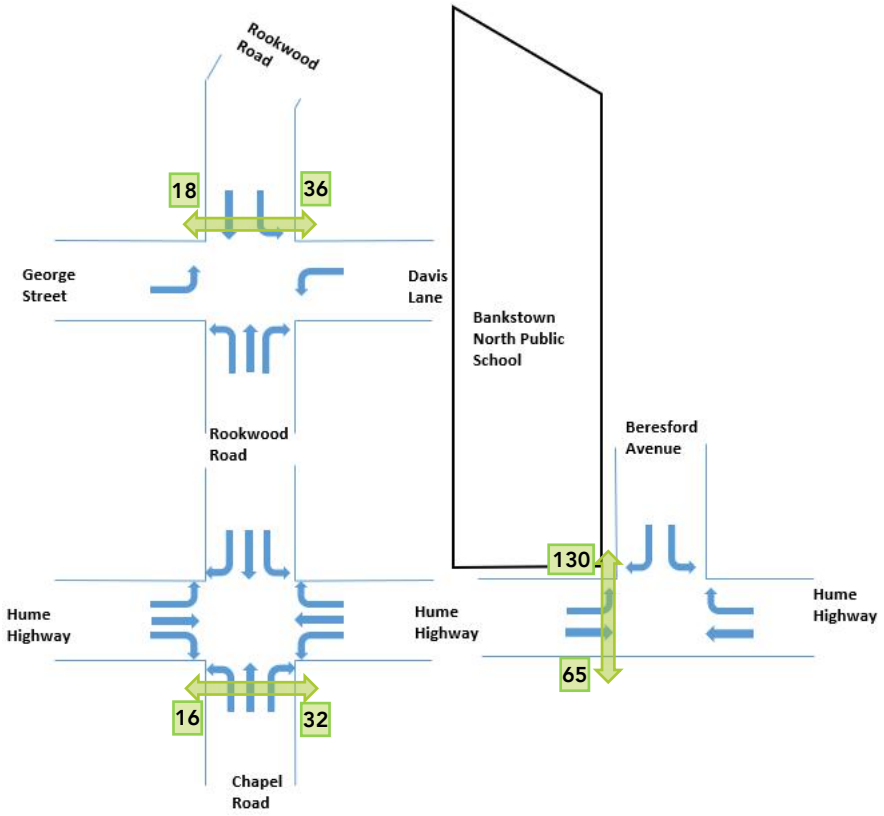
From the student survey as shown in Section 4.1.1, we know that 25% of students walk to school in the morning and 31% students walk from school in the evening. However, the primary school students are accompanied by parents and therefore, it is assumed that every student is accompanied by one (1) parent/carer. The number of existing pedestrians and pedestrian trips is shown in Table 11 and Table 12 respectively. The trip distribution including the inbound movement for parents and students and the outbound movement for parents is shown in Figure 44 and Figure 45.

Table 11 – Existing Pedestrians

Existing Students	Peak Hour	Pedestrian Percentage	No. of Existing Walking Students	No. of Existing Pedestrians including Parents
330	AM	25%	83	166
	PM	31%	102	204

Table 12 – Existing Pedestrian Trip Distribution

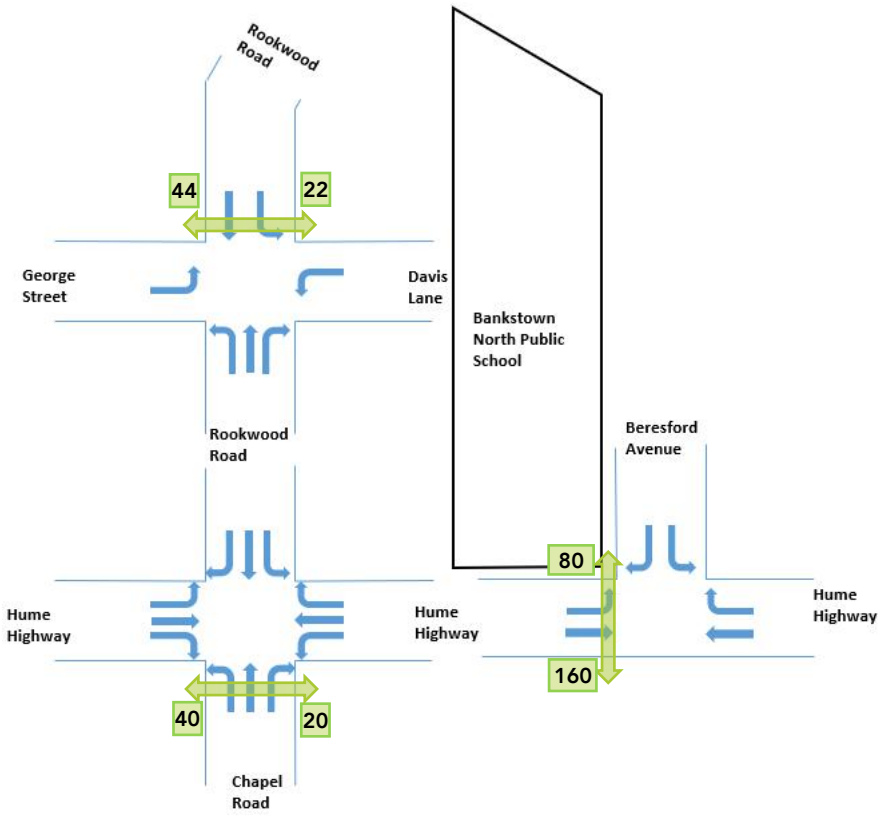
Peak Hour	Total No. of Existing Pedestrians	North of Hume Highway (22%)	South of Hume Highway (78%)
AM	166	36	130
PM	204	44	160



Pedestrian Crossing 16 32

16 Pedestrians from East to West
32 Pedestrians from West to East

Figure 44 – Existing AM School Peak Pedestrian Traffic Distribution



Pedestrian Crossing 40 20

40 Pedestrians from East to West
20 Pedestrians from West to East

Figure 45 – Existing PM School Peak Pedestrian Traffic Distribution

6.4.2 Future Pedestrians

For the future pedestrian analysis, the number of students is prorated based on the student number increase, keeping the parameters such as pedestrian percentage and student parent ratio the same as the existing (refer to Table 11 in Section 6.4.1). The total number of estimated pedestrians and the future pedestrian trips is shown in Table 13 and Table 14 respectively.

Table 13 – Future Pedestrians

Student No. Increase	Peak Hour	Pedestrian Percentage	No. of Future Walking Students	No. of Future Pedestrians including Parents
314	AM	25%	79	158
	PM	31%	97	194

Table 14 – Future Pedestrian Trip Distribution

Peak Hour	Total No. of Existing Pedestrians	North of Hume Highway (22%)	South of Hume Highway (78%)
AM	158	34	124
PM	194	42	152

The future pedestrian distribution is shown in Figure 46 and Figure 47.

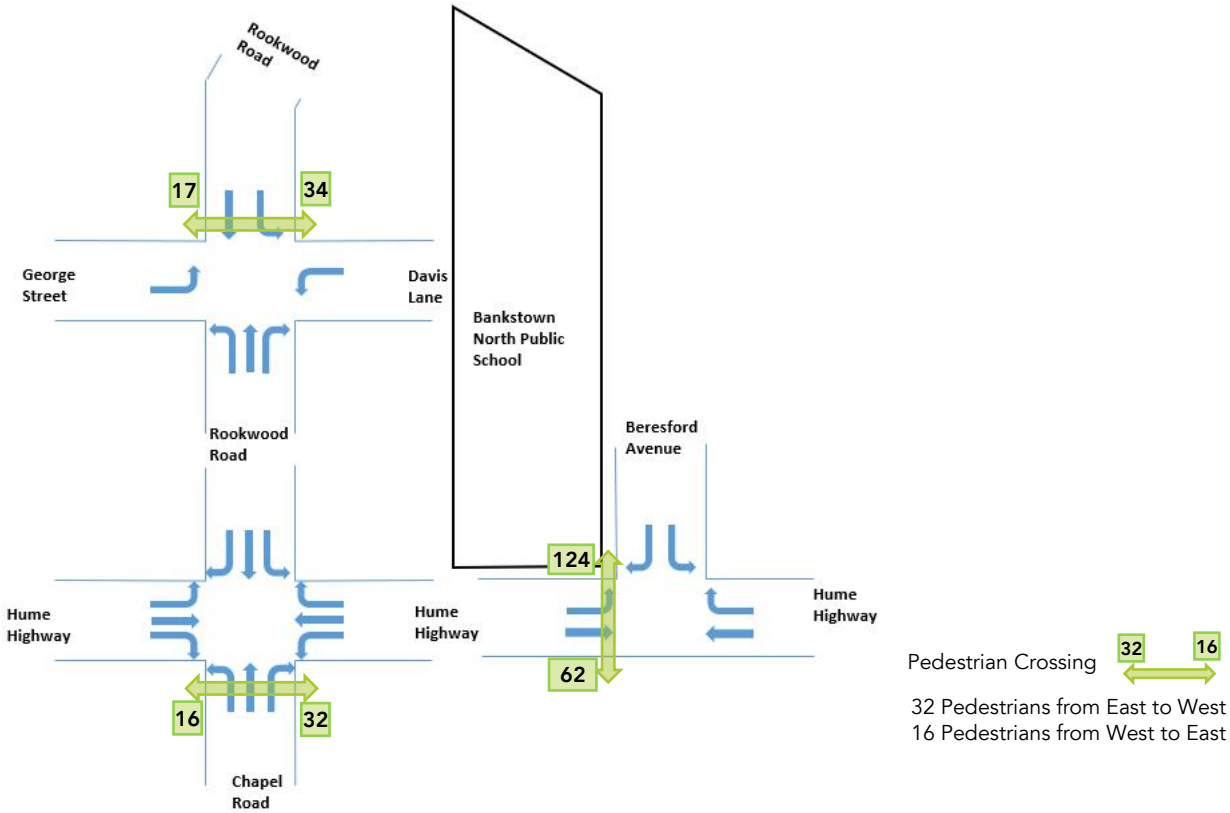


Figure 46 – Future AM School Peak Pedestrian Traffic Distribution

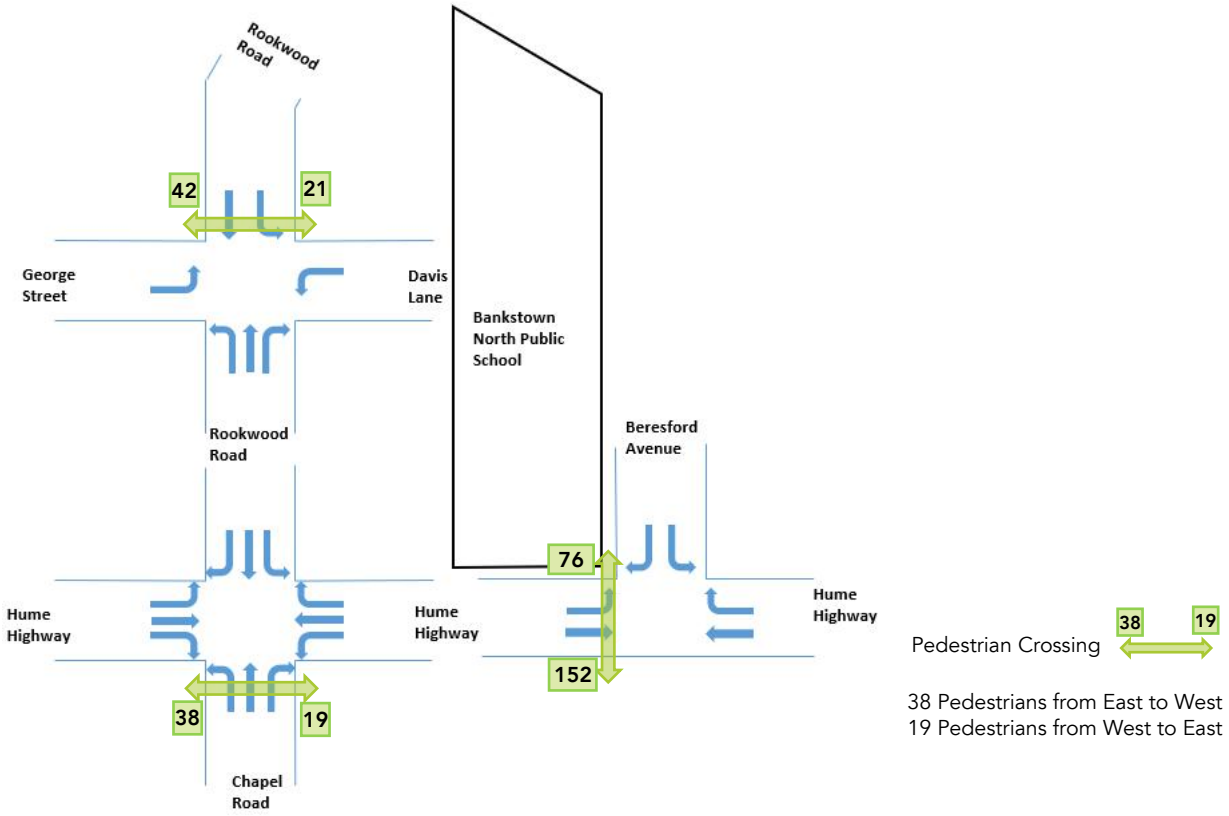


Figure 47 – Future PM School Peak Pedestrian Traffic Distribution

6.4.3 Potential Future Pedestrians

Potential future pedestrians are considered as the number of students that could potentially walk to school from the walkable catchment area. As presented in Figure 42, 16% students live within the walkable catchment area on the north of Hume Highway and 58% students live within the walkable catchment area on the south of Hume Highway. The number of potential future pedestrians from the walkable catchment area is calculated and presented in Table 15, and the trip distribution is shown in Figure 48 and Figure 49 respectively.

Table 15 – Potential Future Pedestrians

No. of Future Students	Peak Hour		Pedestrian Percentage	No. of Future Walking Students	No. of Future Pedestrians including Parents
644	AM and PM	North of Hume Highway	16%	103	206
		South of Hume Highway	58%	374	748

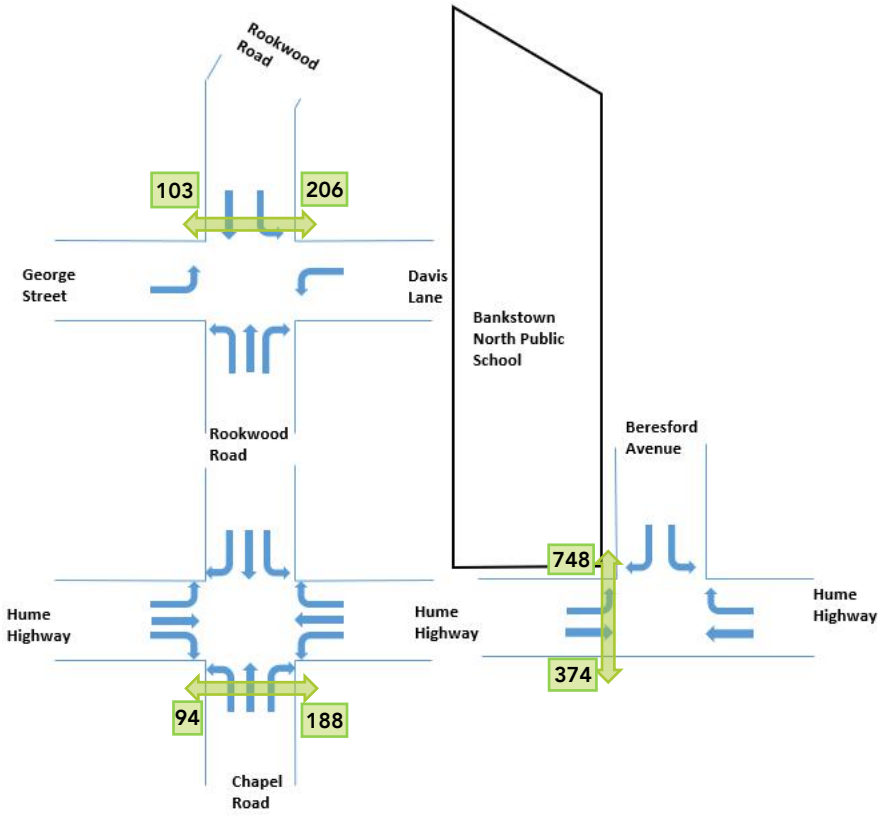


Figure 48 – Potential Future AM School Peak Pedestrian Traffic Distribution

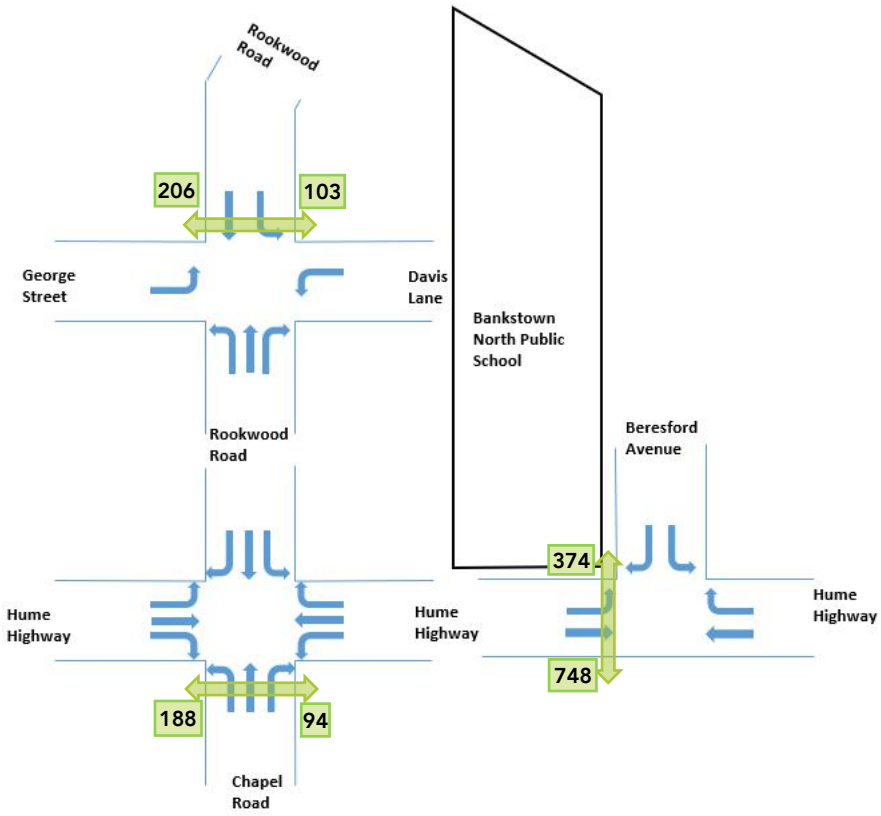


Figure 49 – Potential Future PM School Peak Pedestrian Traffic Distribution

6.5 Intersection Modelling

In order to confirm the current operation of the intersection, an assessment has been undertaken using the SIDRA modelling software, which presents a range of performance indicators (Level of Service, Average Delay, etc.).

Typically, there are four performance indicators used to summarise the performance of an intersection, being:

- Average Delay – The average delay encountered by all vehicles passing through the intersection. It is often important to review the average delay of each approach as a side road could have a long delay time, while the large free flowing major traffic will provide an overall low average delay.
- Degree of Saturation (DoS) – The total usage of the intersection expressed as a factor of 1 with 1 representing 100% use/saturation (e.g. 0.8=80% saturation).
- 95% Queue lengths (Q95) – is defined to be the queue length in metres that has only a 5-percent probability of being exceeded during the analysis time period. It transforms the average delay into measurable distance units.
- Level of Service (LoS) – This is a categorization of average delay, intended for simple reference. The RMS adopts the following bands:

Table 16 – Level of Service Criteria

Level of Service	Average Delay (secs/veh)	Traffic Signals, Roundabout	Give Way & Stop Signs
A	<14	Good operation	
B	15 to 28	Good with acceptable delays & spare capacity	Acceptable delays & spare capacity
C	29 to 42	Satisfactory	Satisfactory, but accident study required
D	43 to 56	Operating near capacity	Near capacity & accident study required
E	57 to 70	At capacity. At signals, incidents would cause excessive delays. Roundabouts require other control mode	At capacity, requires other control mode
F	>70	Extra capacity required	Extreme delay, major treatment required

For the SIDRA analysis, all but the Stacey Street / Rookwood Road intersection have been coordinated in a network, which is in line with the alex files received from RMS.

6.5.1 Modelling Scenarios

The intersections have been modelled with three different scenarios as follows:

- Existing Scenario

  The existing scenario is modelled with the existing intersection arrangements with the existing traffic.

- Future Existing Scenario

  The future existing scenario is modelled with the proposed changes to the intersection arrangements with the existing traffic. In this scenario, consideration has been made to the existing school traffic along with the proposed changes in the Hume Highway / Beresford Avenue intersection and Rookwood Road / George Street / Davis Lane intersection. This also includes changes in the future school traffic as described in Section 6.3.2, with the parents/student's vehicles entering via Beresford Avenue and exiting via Davis Lane.

- Future Development Scenario

  The future development scenario is modelled with the proposed changes to the intersection arrangements with the additional traffic volumes for parents/students and staff as described in Section 6.3.1 and 6.3.3 respectively.

6.5.2 SIDRA Results

Table 17 summarises the most relevant SIDRA results for the existing condition, future existing condition, and future development condition with the summary and a comparison of the network operation. Full SIDRA results can be found in Attachment 3.

Table 17 – SIDRA Modelling Results for pre and post-development

Intersection	Time	Period	Average LoS	Average Delay (s)	Highest DoS (v/s)	Highest Q95 (m)
Stacey Street / Hume Highway	AM Peak	Existing	E	63.5	1.279	352.8
		Future Existing	E	58.1	1.115	350.3
		Future Development	E	66.6	1.275	446.5
	PM Peak	Existing	E	61.0	0.978	299.0
		Future Existing	E	58.2	0.941	289.3
		Future Development	E	60.8	0.971	312.2
Stacey Street / Beresford Avenue	AM Peak	Existing	A	4.3	0.629	102.5
		Future Existing	A	4.2	0.629	102.5
		Future Development	A	4.1	0.629	102.5
	PM Peak	Existing	B	18.8	0.849	255.5
		Future Existing	B	18.6	0.849	255.5
		Future Development	B	18.3	0.849	255.5
Stacey Street / Rookwood Road	AM Peak	Existing	B	15.8	0.556	91.2
		Future Existing	B	15.9	0.556	95.0
		Future Development	B	16.0	0.556	100.1
	PM Peak	Existing	A	12.2	0.636	69.5
		Future Existing	A	12.2	0.636	69.5
		Future Development	A	12.2	0.639	70.0
Rookwood Road / George Street / Davis Lane	AM Peak	Existing	A	14.2	0.709	64.8
		Future Existing	B	15.5	0.709	64.8
		Future Development	B	16.8	0.709	64.8
	PM Peak	Existing	A	12.0	0.484	83.5
		Future Existing	A	13.3	0.534	95.7
		Future Development	B	16.3	0.833	92.4
Hume Highway / Rookwood Road / Chapel Road	AM Peak	Existing	D	54.1	1.090	447.6
		Future Existing	D	53.5	1.068	434.8
		Future Development	D	55.6	1.065	472.4
	PM Peak	Existing	C	38.1	0.997	233.1
		Future Existing	C	36.5	1.047	222.6
		Future Development	D	42.9	0.959	279.7
Hume Highway / Beresford Avenue	AM Peak	Existing	A	11.1	0.884	172.6
		Future Existing	A	13.8	0.906	215.5
		Future Development	B	20.0	0.934	278.8 170.8*
	PM Peak	Existing	A	2.9	0.573	31.7
		Future Existing	A	1.3	0.629	37.4
		Future Development	A	1.9	0.623	55.4 34.0*

*Average Delay for Hume Highway / Beresford Avenue intersection

Stacey Street / Hume Highway Intersection
The overall LoS at this intersection is currently E in the AM and PM peak hours. It is noted that this intersection is currently operating with no spare capacity. The proposed development increases the queue length marginally but does not significantly affect the operation of this intersection, and therefore, the traffic impact at this intersection as a result of the development will be minor.

Stacey Street / Beresford Avenue Intersection
The overall LoS at this intersection is A in the AM and B in the PM peak hour. The proposed development does not affect the operation of this intersection.

Stacey Street / Rookwood Road Intersection
The overall LoS at this intersection is B in the AM peak hour and A in the PM peak hour. The proposed development increases all parameters only marginally, and with spare capacities of 35% and more the intersection peris anticipated to perform well post development.

Rookwood Road / George Street / Davis Lane Intersection
The overall LoS at this intersection is currently A in the AM and PM peak hours.

Future scenarios have been modelled including the TfNSW plans of signalising the Davis Lane arm in order to allow through traffic from Davis Lane and adding pedestrian crossings to the eastern and southern arm of the intersection. Post development, the LoS will change to B for both peak hours with a minimum spare capacity of 16%, which is considered to be acceptable. For the future development scenario, the 95th percentile queue length along Davis Lane during the PM peak is noted to be 70m while the length of Davis Lane is approximately 80m. This is due to George Street and Davis Lane being minor roads and the phasing for these roads is shorter than for Rookwood Road. It is noted that the queue along Davis Lane only affects mostly school traffic and will occur within a 30-minute window. The development is not considered to significantly affect other road users.

Hume Highway / Rookwood Road / Chapel Street
In regard to the Hume Highway / Rookwood Road / Chapel Street intersection, the summary states that the intersection is currently operating at capacity with a LoS D in the AM peak hour and LoS C in the PM peak hour. Post-development the LoS of the intersection remains same for the AM Peak hour but changes to D for the PM peak hour, while the other performance measures increase marginally, but are considered to be acceptable.

Hume Highway / Beresford Avenue
The overall LoS at this intersection is currently A in the AM and PM peak hours. The left and right turns from Beresford Avenue have a LoS E; however, it is noted that there are detectors located at the Beresford Avenue arm, which trigger a change in traffic lights when vehicles approach the intersection. This arrangement has not been taken into consideration in the SIDRA model, meaning that the actual waiting time is significantly shorter. Nevertheless, traffic impacted at this exist in solely generated by the school, as no other land uses are located along Beresford Avenue.

Future scenarios have been modelled based on the TfNSW plans of restricting right turn movements from and into Hume Highway by constructing a median along the Hume Highway and thereby diverting the exiting school traffic towards Davis Lane. Post-development, the LoS of the intersection remains the same, however, the other parameters increase marginally. In future development scenario, a queue length of 278.8m is noted for the AM peak hour, however, this queue represents the 95th percentile probability of a queue, meaning that this queue length, if at all, would occur for a short period of time. The average queue during this time is noted to be 170.8m.

Sidra Results Summary

Based on SIDRA analysis, it is noted that the traffic generated by the proposed development does not significantly affect the performance of the nearby intersections and can be accommodated within the existing arrangement and proposed changes of the road network.

7. Access and Car Park Assessment

7.1 Pedestrian Access

It is proposed that the main pedestrian entry remains off Beresford Avenue (pink circle in Figure 50) and the existing gate off Davis Lane is proposed to be upgraded (green circle in Figure 50) and function as a main entry point for students walking from the west. In addition, a pedestrian link including a zebra crossing will be constructed between Davis Lane gate, across the pick-up and drop-off area through to the school buildings to provide appropriate connectivity.

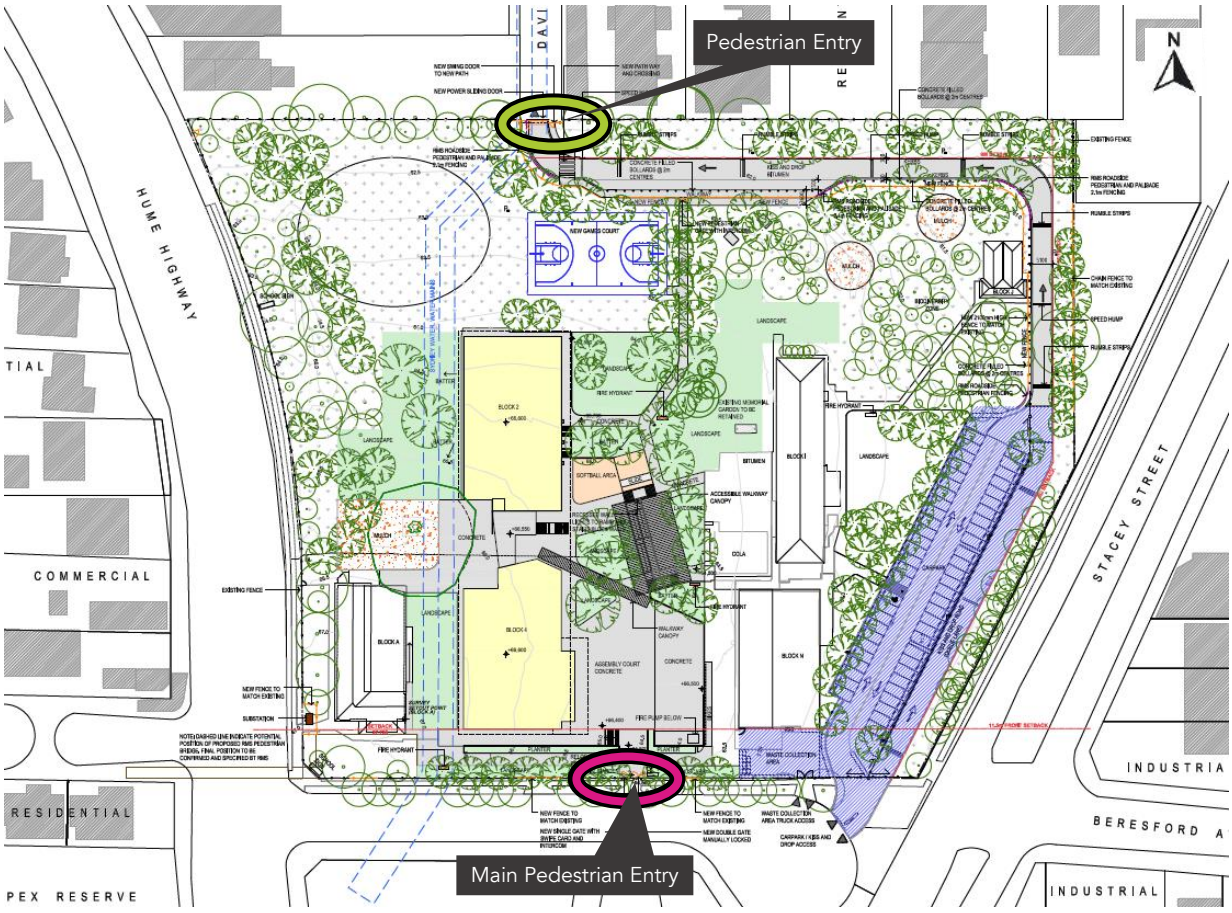


Figure 50 – Pedestrian Access Points

As described in Section 3.3.1, Hume Highway and Stacey Street represent a barrier for pedestrians, and in particular for students that live south and south-east from the school. However, it is noted that RMS is proposing to develop a pedestrian bridge across Hume Highway in close proximity to Beresford Avenue, which will be beneficial when promoting active transport and pedestrian safety at the school.

The project is proposing to work with the authorities to implement a staggered pedestrian crossing with a holding area at the median of the Hume Highway. A staggered pedestrian crossing would encourage the school community living within 1.2km to the south of the Hume Highway to walk to school.

Although public transport utilisation is low at this school (refer to Section 3.2), construction of the proposed foot bridge across Hume Highway may make the utilisation of bus and train services more attractive.

7.2 Vehicular Access

The following section presents an assessment of the proposed development with reference to the requirements of AS2890.1:2004 *(Off-street car parking)* and AS2890.6:2009 *(Off-street parking for people with disabilities)*. This section is to be read in conjunction with the architectural drawings in Attachment 1. The design review can be found in Attachment 4.

7.2.1 Car Parking Arrangement

The proposed car park access and parking arrangements of the at grade car park have been assessed against the requirements of AS2890.1:2004, with reference to Class 1A (employee) facilities. The Class 1A facilities are to provide the following dimensions (90° angle parking):

- Car Spaces: 2.4m x 5.4m
- Aisle Width: 5.8m

All general parking spaces have been individually assessed and found to be at least 2.4m x 5.4m in dimensions, with a minimum aisle width of 5.8m. All spaces meet the clearance requirements (door opening and entry flanges) of the parking space envelope requirements provided in Figure 5.2 of AS2890.1.

A single accessible car space is 2.5m wide and 5.4m long and a shared area of same dimension is provided. The accessible space shall be provided in accordance to AS 2890.6. The shared area also provides pedestrian access to the school.

A blind aisle extension of 1m is provided, as per the requirement of AS 2890.1 Clause 2.4.2 (c).

It is assumed that teachers will access the car park outside the pick-up and drop-off hours and the College will manage staff access accordingly so as to avoid conflicts with student drop-off / pick-up.

7.2.2 Staff and Pick-up & Drop-off

Various options of the pick-up and drop-off layout have been investigated, including utilising only Beresford Avenue and using the north-east corner of the site. The main constraints included a clash of the facility with the biodiversity zone located in the north-west corner of the site and the possible queuing onto Hume Highway. A discussion with TfNSW has been held and the authority considers the proposed through road to be the most beneficial arrangement.

The access to the proposed 56 (Class 1A) at grade staff car park is via Beresford Avenue, a local access road. According to AS 2890.1, it will therefore require a Category 1 (combined entry/exit) driveway of 3.0m to 5.5m width. In response, the proposed driveway has a minimum width of 5.8m and is in accordance to the standards.

The driveway and the car park have a maximum gradient of 5% within the property boundary, which satisfies the requirement of AS 2890.1. Section 3.3(a).

It is proposed that the driveway is secured by two separate gates, one servicing the staff car park and the other the pick-up and drop-off facility. Access to either of the gates is provided via individual intercom buttons.

Upon exiting the staff car park, a vehicle will trigger a detector which will then open the staff car park exit gate and the pick-up and drop-off entry gate. It is noted that staff is to exit the school after the pick-up activity finished, in order to minimise potential conflicts between entering and exiting vehicles.

The exit from the pick-up and drop-off facility will occur via a detector activated gate off Davis Lane.

7.2.3 Waste Collection Vehicles

The waste collection vehicle movements will occur during mid-day off-peak periods and will not impact on the peak hour traffic flow.

Waste collection is proposed to occur from within a dedicated waste collection area. A swept path assessment has been undertaken and it has been determined that the front loader waste collection vehicle will be able to enter and exit the site in a forward direction, as shown in the design review in Attachment 4. This arrangement is in accordance to the DCP.

Alternative arrangements have been considered, but due to some disadvantages not pursued further. These options are described below:

- Waste collection vehicle enters the site only partially, collects the bins from just inside the boundary and then reverses out.
    - The truck would block the footpath during collection; and
    - The reverse manoeuvre creates a conflict between the truck and both pedestrians (mostly school children) and private vehicles (staff and parents).

  Therefore, this arrangement is not recommended from a safety perspective.
- Utilisation of the existing infrastructure (i.e. the staff car park) to undertake a U-turn within the site;
    - Provides a level of improvement compared to the previous option; however,
    - From a traffic point of view, it is generally desirable to keep different user groups separated to reduce conflict points; and
    - The car park and the driveway have been designed to accommodate a B99 vehicle only, which does not include the waste collection vehicle. Further assessment and if required amendments to the kerb may be required if the waste collection vehicle is to enter the car park.

7.2.4 Bicycle Spaces

Bicycle spaces shall be provided according to the standards, where a parking space envelope has the dimensions of 1.8m x 0.5m and an aisle of 1.5m is provided.

7.2.5 Assisted School Transport Vehicles

Some students with disabilities utilise transportation to and from school offered by the Assisted School Transport Program. It is proposed that these students are dropped-off and picked-up from within the staff car park, which enables an easy access to school facilities through the pedestrian gate.

After consultation with one of the program's providers, it is known that vehicles transporting students comprise sedans (4 seats), people movers (up to 8 seats), maxi vans (up to 9 seats) and mini buses (up to 12 seats). The current driveway has been designed to accommodate a B99 vehicle, which includes the 9 seater vans. If larger vehicles are to enter the site, it would be recommended to reassess the driveway layout and amend kerbs if required.

7.2.6 Emergency Vehicles

In order to service the existing buildings, the new staff car park and the new internal road will need to be accessed by a fire truck. It is noted that the current driveway has been designed to accommodate a B99 vehicle and will need to be assessed and adjusted if required at the detail design stage.

7.2.7 Sight Distance

The location of the proposed access driveway is considered appropriate, in regards to sight distance. AS2890.1 Clause 3.2.4 stipulates that a roadway with a speed limit of 50 km/h must accommodate a desirable sight distance of 69m or a minimum stopping sight distance of 45m. The proposed driveway is located at the end of a cul-de-sac and runs parallel to the roadway. Vehicle Sight distance to the left and right is met.

The triangular pedestrian sight splays (2.0m x 2.5m) with a maximum height of 1.15m is provided at the driveway as per AS2890.1.

7.2.8 Safety Features

The car park has been assessed against the SINSW Vehicle Safety Program General standard and deemed to satisfy this document. The standard can be found in **Attachment 5** and the individual points addressed are listed below, which our responses in italics.

- Vehicle Access and Egress to school site:
    - Install sliding control gate with card access and remote override
      -> Provided at both access points off Beresford Avenue and Davis Lane
    - Install speed limit signs
      -> Shall be provided at a later stage
    - Install vehicle rumble strips
      -> Provided behind the entry gate to the pick-up and drop-off lane
    - Recommend that vehicle movements be minimised 30mins prior to the school start time, and 30mins after school finish time
      -> Shall be ensured when site accessible for parents.
- Vehicle access generally:
    - Speed limit of 10km/hr be introduced on all roads and vehicle access on school sites
      -> Appropriate signage shall be installed
- Roadways with Buildings within 5m: Where roadway is within 2m of the building install:
    - At bends and 2m before and after change of direction, RMS Roadside Pedestrian Fencing
      -> Provided along the inner kerb of the internal road
    - On straights 90mm concrete filled steel bollards at 2m centres
      -> Provided along the inner kerb of the internal road
- Parking Areas with Buildings within 2m: Due the proximity of the vehicle to the buildings it is proposed to undertake the following:
    - Wheel stop to be installed in each vehicle bay
      -> No parking spaces are located within 2m of a building, therefore not required

  - 150mm concrete filled steel bollards in the centre of each parking space
    -> No parking spaces are located within 2m of a building, therefore not required

- Parking Areas with Buildings within 5m: Due the proximity of the vehicle to the buildings it is proposed to undertake the following:
  - Wheel stop to be installed in each vehicle bay
    -> Provided at all spaces located within 5m of a building
  - Telegraph pole installed on concrete cradles
    -> No telegraph poles are located within 5m of parking areas
- Pedestrian and vehicle shared access to the school via a roadway:
  - Separation of vehicle and pedestrian access ways
    -> Provided. As described in Section 7.1, pedestrian access is provided off Hume Highway and in form of a main entry off Beresford Avenue. Vehicular access is provided via a new driveway off Beresford Avenue, with a vehicular only exit off Davis Lane
  - RMS Roadside Pedestrian Fencing to provide separation between pedestrian and vehicle routes
    -> Provided, along the inner kerb of the internal road. It is assumed that no pedestrians will walk between the internal road and the northern and western site boundary, therefore no fence is required on the outer kerb of the internal road
- Student Drop off on the School Sites: For drop off zones within school premises;
  - Introduce 10km/hr speed limits
    -> Appropriate signage shall be installed at a later stage
  - Introduce rumble strips and traffic calming measures
    -> Rumble strips and speed humps provided along the internal road
  - At bends and 2m before and after change of direction, RMS Roadside Pedestrian Fencing
    -> Provided along the inner kerb of the internal road
  - On straights 90mm concrete filled steel bollards at 2m centres
    -> Provided along the inner kerb of the internal road
- Parking outside of formally designated Parking areas within the school site: It is proposed to implement the following:
  - The use of all non-designated parking areas to be discontinued or formalised
    -> The site does not have informal parking spaces
  - If areas are discontinued, vehicle barriers and bollards to be installed to prevent reuse
    -> The site does not have informal parking spaces, therefore this measure is not required
  - For formalised areas, signage, traffic calming measures, and barriers to be installed
    -> Signage to be provided at a later stage. Fencing provided around the car parking area.
  - In the event of temporary parking on site traffic control and temporary barriers to be utilised
    -> No temporary parking on site is proposed
- Waiting areas for Bus pick up: For drop off zones within school premises;

- Introduce 10km/hr speed limits
  -> No bus pick up location is proposed within the site
- Waiting area be separated from bus zone by RMS Roadside Pedestrian Fencing with limited openings
  -> No bus pick up location is proposed within the site

8. Conclusion

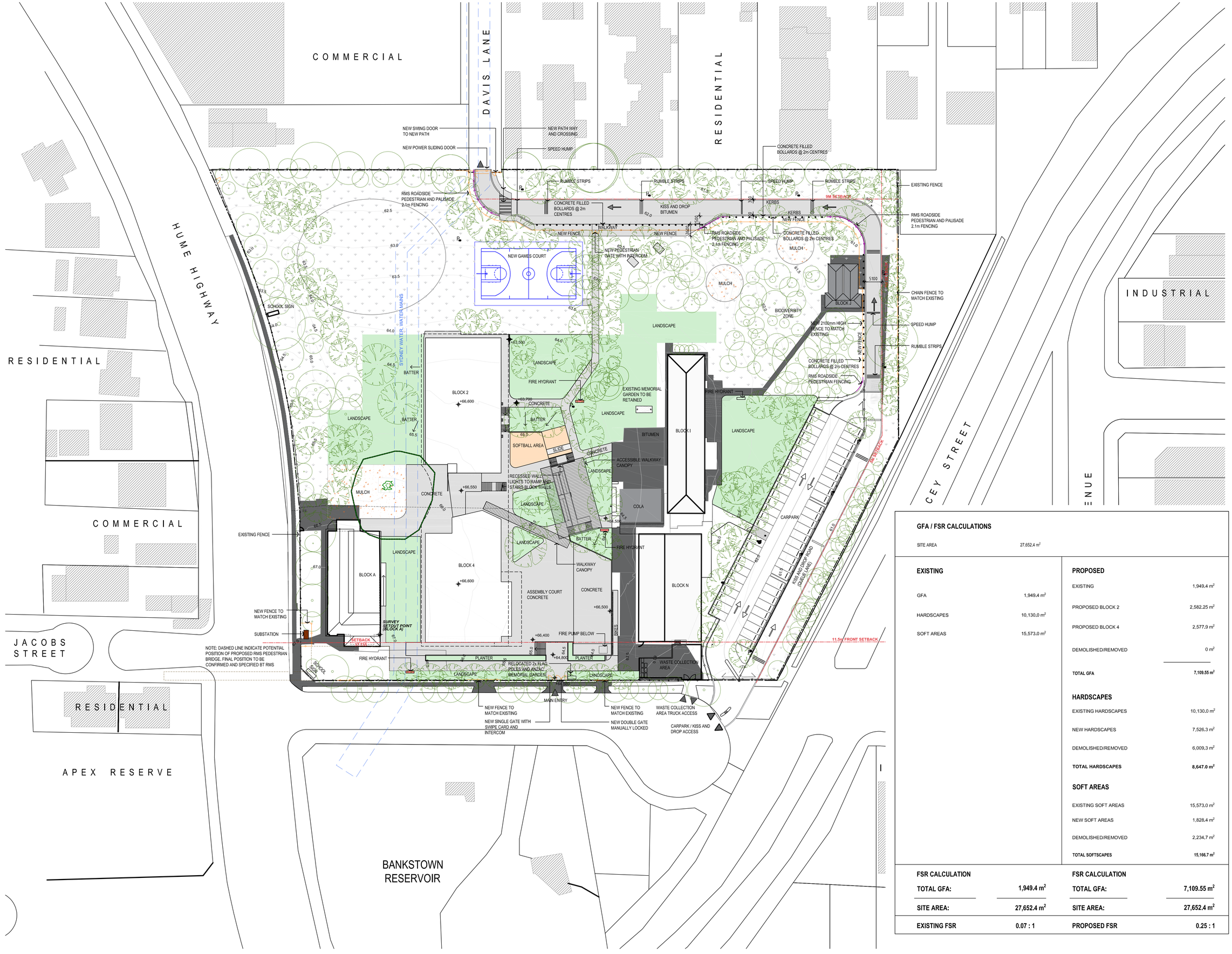
The following section outlines the key findings throughout the course of study:

- The proposed expansion of Bankstown North Public School involves upgrading the existing school facilities to accommodate a total of 644 students from the current 330 capacity. The staff headcount is also expected to increase from the current 22 FTE staff to approximately 47 FTE staff to support the growth of the school.
- A review of the available public transport services operating within the vicinity of the school indicates that the vast majority of busses operates along Hume Highway, Rookwood Road and Chapel Road, providing connectivity to Strathfield and the wider Sydney area. While these services might provide an alternative transportation mode to staff, there is a lack of services from within residential areas where students live.
- In terms of active transport, the school has a poor connectivity to bicycle routes. However, with the implementation of the Green Travel Plan and future upgrades to the local infrastructure, including the proposed staggered pedestrian crossing across the Hume Highway, an uptake in cycling may be observed. Therefore, as part of this development, the school will provide 48 bicycle spaces. Additionally, some pedestrian scooter parking will be installed.
- A review of the pedestrian infrastructure around the school indicates that Hume Highway and Rookwood Road represent a significant barrier for pedestrians, and in particular for students who live south and west of the school. While signalised crossings are provided, the main roads are wide and busy and therefore unsuitable for children in primary school ages. Residential areas in the vicinity provide either no or just one footpath on the side of the road.
- Online questionnaires have been undertaken for students and staff to understand the existing traffic and parking profile of students and staff on a typical school day. The results are summarised below:
    - The primary mode of transport for students is by car (71% in the AM and 68% in the PM peaks, respectively);
    - This was followed by walking which comprised 25% and 31% in the AM and PM peaks respectively;
    - The weighted average vehicle occupancy rates were 1.79 and 1.80 occupants/vehicle in the AM and PM peaks respectively;
    - In terms of staff travel mode, all staff travel by car (as driver) and park within the school.
- From the online as well as the pick-up and drop-off surveys it has been determined that currently parents use mostly Beresford Avenue and Davis Lane, but also Hume Highway and other locations to drop-off and pick-up their children. Taking this and the anticipated increase in student numbers into consideration, a new design layout has been provided, where the pick-up and drop-off lane has a one-way arrangement. The access is proposed to be off Beresford Avenue and exit off Davis Lane. With 8 designated pick-up and drop-off spaces and a total queuing capacity of approximately 250m, the proposed arrangement can easily cater for the anticipated demand of 256 and 243 vehicles in the morning and afternoon respectively.
- It is also proposed to change the current "Pick-up and Drop-off" restriction along Beresford Avenue to P15, as a means to designate these spaces to parents who wish to accompany their children to and

from the school. This section is approximately 100m long and allows for 17. This "Park and Walk" area should be restricted to school peak times, after which the spaces become unrestricted, as per the existing arrangement.

- With regard to the pick-up management, similar to the existing arrangement, it is proposed to allocate one staff member to read out student numbers located on the vehicle's dashboards and another staff member per two pick-up and drop-off spaces to assist students. With eight proposed pick-up and drop-off spaces, the school would require to allocate five staff members in the afternoon to manage the pick-up process. Alternatively, the school can implement staggered bell times, which would reduce the pick-up queue.
- The proposed new car park aligns with the expected car parking demand of 47 FTE school staff and is therefore considered suitable for the proposed development;
- The existing and post-development scenarios for the surrounding road network have been modelled using SIDRA 8 intersection software. The future intersection layouts have been designed based on the proposed changes by TfNSW, where all right turns at the Hume Highway / Beresford Avenue intersection are banned and the Davis Lane arm at the intersection with Rookwood Road is signalised and through movements into George Street are permitted. The analysis takes into consideration changed vehicular routes of current pick-ups and drop-offs due to the proposed layout redesign. All interactions surrounding the school have been modelled as a network, and the results show that only the Rookwood Road / George Street / Davis Lane intersection has been marginally impacted by the proposed development due to the increase in vehicles exiting the Davis Lane. However, the SIDRA analysis for future school traffic shows that this intersection will be operating with a LoS B with minimum 28% spare capacity, which is considered acceptable.
- Pedestrian access will be provided off Beresford Avenue as a main entry and off Davis Lane as a site access for students living to the west of the development.
- Vehicular access is provided via a new driveway off Beresford Avenue. The driveway design is in accordance with the relevant standards.
- Waste collection is proposed to occur within a separated waste collection area and the anticipated vehicle has been shown to be able to enter and exit this area in a forward direction.
- All aspects of the car park and the new pick-up and drop-off lane have been assessed based on the relevant standards and have been deemed to comply.

Attachment 1 Architectural Drawings



LEGEND

- EXISTING BUILDING OUTLINE
- PROPOSED BUILDING
- PROPOSED HARDSCAPE
- NEW TURF
- EXISTING TURF
- PROPOSED LANDSCAPE
- PROPOSED SOFTFALL
- PROPOSED MULCH
- WORKS COMPLETED UNDER REF
- PROPOSED TREES
- EXISTING TREES
- BOUNDARY
- EXISTING FENCE
- EXISTING GATE
- PROPOSED PALISADE FENCE
- PROPOSED RMS ROADSIDE PEDESTRIAN FENCE
- PROPOSED GATE
- PROPOSED BOLLARD
- PROPOSED VEHICULAR ENTRY / EXIT
- PROPOSED EXTERNAL LIGHTING FIXTURE
- POLE MOUNTED LUMINAIRE

GFA / FSR CALCULATIONS

SITE AREA 27,652.4 m²

EXISTING		PROPOSED	
GFA	1,949.4 m²	EXISTING	1,949.4 m²
HARDSCAPES	10,130.0 m²	PROPOSED BLOCK 2	2,582.25 m²
SOFT AREAS	15,573.0 m²	PROPOSED BLOCK 4	2,577.9 m²
		DEMOLISHED/REMOVED	0 m²
		TOTAL GFA	**7,109.55 m²**

HARDSCAPES

EXISTING HARDSCAPES	10,130.0 m²
NEW HARDSCAPES	7,526.3 m²
DEMOLISHED/REMOVED	6,009.3 m²
TOTAL HARDSCAPES	**8,647.0 m²**

SOFT AREAS

EXISTING SOFT AREAS	15,573.0 m²
NEW SOFT AREAS	1,828.4 m²
DEMOLISHED/REMOVED	2,234.7 m²
TOTAL SOFTSCAPES	**15,166.7 m²**

FSR CALCULATION		FSR CALCULATION	
TOTAL GFA:	**1,949.4 m²**	**TOTAL GFA:**	**7,109.55 m²**
SITE AREA:	**27,652.4 m²**	**SITE AREA:**	**27,652.4 m²**
EXISTING FSR	**0.07 : 1**	**PROPOSED FSR**	**0.25 : 1**

GRAY PUKSAND

Contractors to use Architectural drawings for set out.
Contractors to check & verify all Dimensions on Site prior to Construction/Fabrication, Figured Dimensions take precedence over Scaled Dimensions.
Any Discrepancies should be immediatley referred to the Architect.
All work to comply with N.C.C. Statutory Authorities & Relevant Australian Standards.

NSW Nominated Architects Scott Moylan 7147 Craig Saltmarsh 6569

RPS dfp BLACKETT MAGUIRE GOLDSMITH GALLAGHER STUDIO
erbas NORTHROP
NSW GOVERNMENT Education School Infrastructure

REV	DESCRIPTION	DATE
P1	PRELIMINARY ISSUE	28/09/2020
P2	PRELIMINARY ISSUE	30/09/2020

PROJECT NO	220067
DRAWN	ZK
CHECKED	JL
APPROVED	JL

BANKSTOWN NORTH PUBLIC SCHOOL

322 Hume Hwy, Bankstown NSW 2200

PRELIMINARY

PROPOSED SITE PLAN - STAGE 2

DWG # SD-013 REV P2

SCALE @ A1 1:500

Attachment 2 Future Intersection Arrangements

existing

future

Add the following:
- Concrete island
- Pedestrian fencing
- Pram ramps
- Pedestrian traffic lights

Remove line marking

Relocate traffic light pole

Add line marking and pram ramp

ptc.

Suite 502, 1 James Place
North Sydney NSW 2060

t +61 2 8920 0800

ptcconsultants.co

rev	date	comment / description	drawn	reviewed
2	25/09/20	For Information	KB	AM
1	03/09/20	For Information	KB	AM

project
Bankstown North Public School

drawing title
Intersection changes

Hume Highway / Beresford Avenue

client	SINSW
drawing #	ptc-001
project #	KB - 2710
scale	1 : 500

rev 2

Attachment 3 SIDRA Results

MOVEMENT SUMMARY

Site: 857 [Hume Hwy / Stacey St AM - Existing]

Network: N101 [Existing AM]

Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 150 seconds (Network Site User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Stacey Street (S)														
1	L2	117	9.9	117	9.9	0.842	44.3	LOS D	47.2	352.8	0.95	0.89	0.97	26.7
2	T1	1334	7.4	1334	7.4	0.842	38.9	LOS C	47.2	352.8	0.95	0.88	0.97	26.8
3	R2	562	8.4	562	8.4	0.963	103.9	LOS F	25.9	194.5	1.00	1.06	1.44	17.5
Approach		2013	7.8	2013	7.8	0.963	57.4	LOS E	47.2	352.8	0.96	0.93	1.10	22.6
East: Hume Highway (E)														
4	L2	565	10.8	565	10.8	0.894	43.4	LOS D	31.5	240.7	0.69	0.84	0.81	29.5
5	T1	1223	8.5	1223	8.5	0.850	60.9	LOS E	30.0	225.5	0.98	0.92	1.07	10.7
Approach		1788	9.2	1788	9.2	0.894	55.4	LOS D	31.5	240.7	0.89	0.90	0.98	17.4
North: Stacey Street (N)														
7	L2	34	12.5	34	12.5	0.078	51.1	LOS D	1.8	13.7	0.76	0.70	0.76	18.4
8	T1	883	10.6	883	10.6	0.977	91.9	LOS F	37.0	282.3	1.00	1.15	1.35	18.9
Approach		917	10.7	917	10.7	0.977	90.4	LOS F	37.0	282.3	0.99	1.14	1.33	18.9
West: Hume Highway (W)														
10	L2	31	3.4	31	3.4	0.776	36.4	LOS C	21.8	163.2	0.81	0.73	0.81	11.5
11	T1	1682	8.4	1682	8.4	0.776	29.8	LOS C	21.8	163.2	0.76	0.69	0.76	23.5
12	R2	234	7.7	234	7.7	1.279	318.2	LOS F	21.9	163.2	1.00	1.51	2.47	6.0
Approach		1946	8.2	1946	8.2	1.279	64.5	LOS E	21.9	163.2	0.79	0.79	0.97	14.5
All Vehicles		6664	8.7	6664	8.7	1.279	63.5	LOS E	47.2	352.8	0.90	0.91	1.06	18.5

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

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
P2	East Full Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
P2B	East Slip/Bypass Lane Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
P3	North Full Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
P3B	North Slip/Bypass Lane Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
All Pedestrians		263	69.3	LOS F			0.96	0.96

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 3508 [Stacey St / Beresford Ave AM - Existing]

Network: N101 [Existing AM]

Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 150 seconds (Network Site User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
SouthEast: Stacey Street (SE)														
5	T1	1309	7.3	1309	7.3	0.400	0.3	LOS A	1.5	11.4	0.04	0.03	0.04	67.6
6	R2	68	6.2	68	6.2	0.187	16.3	LOS B	1.9	13.9	0.44	0.71	0.44	39.4
Approach		1378	7.3	1378	7.3	0.400	1.1	LOS A	1.9	13.9	0.06	0.07	0.06	60.6
NorthEast: Beresford Avenue (NE)														
7	L2	27	23.1	27	23.1	0.234	68.6	LOS E	1.9	15.6	0.92	0.74	0.92	17.6
9	R2	13	8.3	13	8.3	0.154	82.4	LOS F	0.9	7.0	0.99	0.68	0.99	15.5
Approach		40	18.4	40	18.4	0.234	73.0	LOS F	1.9	15.6	0.94	0.72	0.94	16.9
NorthWest: Stacey Street (NW)														
10	L2	9	0.0	9	0.0	0.629	12.0	LOS A	12.3	93.6	0.40	0.37	0.40	48.7
11	T1	914	10.6	914	10.6	0.629	6.0	LOS A	13.4	102.5	0.42	0.39	0.42	47.3
Approach		923	10.5	923	10.5	0.629	6.1	LOS A	13.4	102.5	0.42	0.39	0.42	47.3
All Vehicles		2341	8.7	2341	8.7	0.629	4.3	LOS A	13.4	102.5	0.21	0.20	0.21	49.7

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

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P3	NorthEast Full Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
P4	NorthWest Full Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
All Pedestrians		105	69.3	LOS F			0.96	0.96

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 3509 [Stacey St / Rookwood Rd AM - Existing]

Network: N101 [Existing AM]

Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 80 seconds (Site User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
SouthEast: Stacey Street (SE)														
4	L2	16	0.0	16	0.0	0.511	23.3	LOS B	12.2	90.6	0.74	0.67	0.93	30.3
5	T1	1341	7.3	1341	7.3	0.511	16.0	LOS B	12.3	91.2	0.74	0.66	0.80	47.5
Approach		1357	7.2	1357	7.2	0.511	16.1	LOS B	12.3	91.2	0.74	0.66	0.80	47.4
NorthWest: Rookwood Road (NW)														
11	T1	909	10.4	909	10.4	0.273	0.1	LOS A	0.5	3.6	0.03	0.02	0.03	69.5
12	R2	434	8.7	434	8.7	0.354	27.6	LOS B	6.3	47.8	0.79	0.79	0.79	31.2
Approach		1343	9.9	1343	9.9	0.354	9.0	LOS A	6.3	47.8	0.27	0.27	0.27	49.7
SouthWest: Rookwood Road (SW)														
1	L2	698	5.0	698	5.0	0.556	28.5	LOS B	11.1	81.3	0.86	0.82	0.86	34.5
Approach		698	5.0	698	5.0	0.556	28.5	LOS B	11.1	81.3	0.86	0.82	0.86	34.5
All Vehicles		3398	7.8	3398	7.8	0.556	15.8	LOS B	12.3	91.2	0.58	0.54	0.61	44.1

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

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P2	SouthEast Full Crossing	53	34.3	LOS D	0.1	0.1	0.93	0.93
P1	SouthWest Full Crossing	53	34.3	LOS D	0.1	0.1	0.93	0.93
All Pedestrians		105	34.3	LOS D			0.93	0.93

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 4276 [Rookwood Rd / George St / Davis Ln AM - Existing]

Network: N101 [Existing AM]

Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 150 seconds (Network Site User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Rookwood Road (S)														
1	L2	127	1.7	127	1.7	0.342	13.2	LOS A	7.2	53.2	0.70	0.66	0.70	33.2
2	T1	419	10.1	419	10.1	0.342	10.2	LOS A	7.2	53.2	0.71	0.64	0.71	20.3
3	R2	31	0.0	31	0.0	0.342	14.0	LOS A	6.8	51.6	0.71	0.62	0.71	25.0
Approach		577	7.7	577	7.7	0.342	11.1	LOS A	7.2	53.2	0.71	0.64	0.71	26.3
East: Davis Lane (E)														
4	L2	27	3.8	27	3.8	0.026	7.9	LOS A	0.1	1.0	0.14	0.97	0.14	22.0
Approach		27	3.8	27	3.8	0.026	7.9	LOS A	0.1	1.0	0.14	0.97	0.14	22.0
North: Rookwood Road (N)														
7	L2	18	0.0	18	0.0	0.221	10.6	LOS A	4.1	31.0	0.48	0.43	0.48	32.0
8	T1	477	8.6	477	8.6	0.221	7.2	LOS A	4.1	31.0	0.48	0.42	0.48	29.8
Approach		495	8.3	495	8.3	0.221	7.3	LOS A	4.1	31.2	0.48	0.42	0.48	29.9
West: George Street (W)														
10	L2	252	1.7	252	1.7	0.709	35.6	LOS C	9.1	64.8	0.99	0.84	1.00	22.0
Approach		252	1.7	252	1.7	0.709	35.6	LOS C	9.1	64.8	0.99	0.84	1.00	22.0
All Vehicles		1351	6.7	1351	6.7	0.709	14.2	LOS A	9.1	64.8	0.67	0.60	0.67	25.6

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

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P3	North Full Crossing	53	31.8	LOS D	0.1	0.1	0.92	0.92
P4	West Full Crossing	53	31.8	LOS D	0.1	0.1	0.92	0.92
All Pedestrians		105	31.8	LOS D			0.92	0.92

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 61 [Hume Hwy / Rookwood Rd / Chapel Rd AM - Existing]

Network: N101 [Existing AM]

Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 150 seconds (Network Site User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Chapel Road (S)														
1b	L3	238	4.4	238	4.4	0.527	51.1	LOS D	14.9	108.1	0.89	0.81	0.89	23.2
2	T1	316	2.7	316	2.7	0.840	67.7	LOS E	24.1	177.0	1.00	0.96	1.13	16.3
3a	R1	9	100.0	9	100.0	0.840	69.8	LOS E	24.1	177.0	1.00	0.96	1.14	16.3
Approach		563	5.0	563	5.0	0.840	60.8	LOS E	24.1	177.0	0.95	0.90	1.03	19.3
NorthEast: Hume Highway (NE)														
24a	L1	182	6.9	182	6.9	0.540	40.0	LOS C	25.3	189.6	0.88	0.80	0.88	25.5
25	T1	1109	9.2	1109	9.2	0.540	40.1	LOS C	27.4	207.0	0.92	0.82	0.92	21.0
26b	R3	53	2.0	53	2.0	0.286	37.4	LOS C	1.8	13.0	0.90	0.74	0.90	15.6
Approach		1344	8.6	1344	8.6	0.540	40.0	LOS C	27.4	207.0	0.92	0.82	0.92	21.6
North: Rookwood Road (N)														
7b	L3	28	0.0	28	0.0	0.254	36.9	LOS C	7.2	51.8	0.62	0.55	0.62	10.7
8	T1	317	3.3	317	3.3	0.254	32.6	LOS C	7.2	52.1	0.62	0.53	0.62	25.4
9a	R1	144	13.9	144	13.9	0.558	36.3	LOS C	7.0	54.5	0.89	0.74	0.89	19.9
Approach		489	6.2	489	6.2	0.558	33.9	LOS C	7.2	54.5	0.70	0.59	0.70	23.5
SouthWest: Hume Highway (SW)														
30a	L1	265	9.9	265	9.9	0.937	54.7	LOS D	59.1	444.2	0.99	1.02	1.14	12.0
31	T1	1860	7.8	1860	7.8	0.937	52.4	LOS D	59.9	447.6	0.93	0.97	1.09	12.1
32b	R3	258	4.9	258	4.9	1.090	162.8	LOS F	25.9	188.9	1.00	1.39	1.96	10.5
Approach		2383	7.7	2383	7.7	1.090	64.6	LOS E	59.9	447.6	0.94	1.02	1.19	11.6
All Vehicles		4780	7.5	4780	7.5	1.090	54.1	LOS D	59.9	447.6	0.91	0.90	1.04	16.4

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

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
P3	North Full Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
P8	SouthWest Full Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
All Pedestrians		158	69.3	LOS F			0.96	0.96

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 1124 [Hume Hwy / Beresford Ave AM - Existing]

Network: N101 [Existing AM]

Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 150 seconds (Network User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Hume Highway (E)														
5	T1	1303	9.0	1303	9.0	0.305	1.3	LOS A	4.5	33.7	0.07	0.07	0.07	35.5
6	R2	39	0.0	39	0.0	0.365	36.3	LOS C	2.4	17.0	0.83	0.77	0.83	14.6
Approach		1342	8.7	1342	8.7	0.365	2.3	LOS A	4.5	33.7	0.09	0.09	0.09	32.8
North: Beresford Avenue (N)														
7	L2	5	0.0	5	0.0	0.039	63.8	LOS E	0.3	2.4	0.88	0.66	0.88	5.9
9	R2	13	0.0	13	0.0	0.046	62.3	LOS E	0.8	5.5	0.89	0.67	0.89	6.1
Approach		18	0.0	18	0.0	0.046	62.8	LOS E	0.8	5.5	0.89	0.67	0.89	6.0
West: Hume Highway (W)														
10	L2	48	0.0	48	0.0	0.884	19.1	LOS B	21.3	159.2	0.34	0.41	0.42	27.1
11	T1	1872	8.4	1872	8.4	0.884	16.6	LOS B	23.0	172.6	0.36	0.42	0.45	23.2
Approach		1920	8.2	1920	8.2	0.884	16.7	LOS B	23.0	172.6	0.36	0.42	0.45	23.3
All Vehicles		3280	8.3	3280	8.3	0.884	11.1	LOS A	23.0	172.6	0.26	0.28	0.31	24.8

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

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P3	North Full Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
P4	West Full Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
All Pedestrians		105	69.3	LOS F			0.96	0.96

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 857 [Hume Hwy / Stacey St PM - Existing]

Network: N102 [Existing PM]

Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 150 seconds (Network User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Stacey Street (S)														
1	L2	181	7.0	181	7.0	0.627	33.9	LOS C	30.1	224.5	0.78	0.75	0.78	30.7
2	T1	979	8.0	979	8.0	0.627	28.6	LOS C	30.4	227.4	0.78	0.72	0.78	31.1
3	R2	393	9.1	393	9.1	0.938	98.8	LOS F	17.2	129.7	1.00	1.03	1.43	18.1
Approach		1553	8.1	1553	8.1	0.938	47.0	LOS D	30.4	227.4	0.84	0.80	0.95	25.3
East: Hume Highway (E)														
4	L2	557	9.1	557	9.1	0.933	57.7	LOS E	36.9	278.3	0.76	0.90	0.96	25.4
5	T1	1343	7.2	1343	7.2	0.935	73.8	LOS F	40.3	299.0	0.97	1.03	1.20	9.1
Approach		1900	7.8	1900	7.8	0.935	69.1	LOS E	40.3	299.0	0.91	1.00	1.13	14.4
North: Stacey Street (N)														
7	L2	42	2.5	42	2.5	0.069	41.6	LOS C	2.1	15.3	0.74	0.71	0.74	21.4
8	T1	1149	8.0	1149	8.0	0.952	79.9	LOS F	37.8	282.3	1.00	1.12	1.28	20.7
Approach		1192	7.8	1192	7.8	0.952	78.6	LOS F	37.8	282.3	0.99	1.11	1.26	20.7
West: Hume Highway (W)														
10	L2	25	16.7	25	16.7	0.556	55.0	LOS D	22.0	163.2	0.97	0.86	0.97	7.7
11	T1	1135	6.6	1135	6.6	0.556	45.1	LOS D	22.1	163.2	0.95	0.83	0.95	17.9
12	R2	140	5.3	140	5.3	0.978	85.7	LOS F	11.6	84.9	1.00	0.93	1.27	18.1
Approach		1300	6.6	1300	6.6	0.978	49.6	LOS D	22.1	163.2	0.95	0.84	0.98	17.8
All Vehicles		5944	7.6	5944	7.6	0.978	61.0	LOS E	40.3	299.0	0.92	0.93	1.08	19.3

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

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
P2	East Full Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
P2B	East Slip/Bypass Lane Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
P3	North Full Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
P3B	North Slip/Bypass Lane Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
All Pedestrians		263	69.3	LOS F			0.96	0.96

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 3508 [Stacey St / Beresford Ave PM - Existing]

Network: N102 [Existing PM]

Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 150 seconds (Network Site User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
SouthEast: Stacey Street (SE)														
5	T1	880	6.8	880	6.8	0.290	2.8	LOS A	5.3	39.2	0.18	0.16	0.18	54.4
6	R2	99	16.0	99	16.0	0.536	18.0	LOS B	2.4	19.3	0.35	0.69	0.35	38.4
Approach		979	7.7	979	7.7	0.536	4.3	LOS A	5.3	39.2	0.20	0.22	0.20	48.4
NorthEast: Beresford Avenue (NE)														
7	L2	113	14.0	113	14.0	0.719	70.5	LOS E	8.3	64.9	0.98	0.88	1.10	17.3
9	R2	55	11.5	55	11.5	0.319	74.1	LOS F	3.8	29.4	0.97	0.75	0.97	16.7
Approach		167	13.2	167	13.2	0.719	71.6	LOS F	8.3	64.9	0.97	0.84	1.06	17.1
NorthWest: Stacey Street (NW)														
10	L2	29	14.3	29	14.3	0.849	28.7	LOS C	31.9	237.5	0.69	0.71	0.76	37.3
11	T1	1142	7.2	1142	7.2	0.849	23.3	LOS B	34.4	255.5	0.73	0.74	0.80	24.6
Approach		1172	7.4	1172	7.4	0.849	23.4	LOS B	34.4	255.5	0.73	0.74	0.80	25.3
All Vehicles		2318	7.9	2318	7.9	0.849	18.8	LOS B	34.4	255.5	0.52	0.53	0.56	28.4

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

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P3	NorthEast Full Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
P4	NorthWest Full Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
All Pedestrians		105	69.3	LOS F			0.96	0.96

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 3509 [Stacey St / Rookwood Rd PM - Existing]

Network: N102 [Existing PM]

Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 55 seconds (Site User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
SouthEast: Stacey Street (SE)														
4	L2	39	8.1	39	8.1	0.431	22.0	LOS B	6.0	44.4	0.78	0.70	1.08	31.1
5	T1	882	7.2	882	7.2	0.431	14.3	LOS A	6.2	46.3	0.78	0.68	0.87	49.0
Approach		921	7.2	921	7.2	0.431	14.6	LOS B	6.2	46.3	0.78	0.68	0.88	48.6
NorthWest: Rookwood Road (NW)														
11	T1	1159	6.7	1159	6.7	0.355	0.1	LOS A	0.5	3.5	0.03	0.03	0.03	69.5
12	R2	824	5.9	824	5.9	0.636	22.7	LOS B	9.5	69.5	0.88	0.83	0.88	34.6
Approach		1983	6.4	1983	6.4	0.636	9.5	LOS A	9.5	69.5	0.39	0.36	0.39	48.9
SouthWest: Rookwood Road (SW)														
1	L2	416	7.6	416	7.6	0.325	19.6	LOS B	4.1	30.8	0.76	0.77	0.76	39.3
Approach		416	7.6	416	7.6	0.325	19.6	LOS B	4.1	30.8	0.76	0.77	0.76	39.3
All Vehicles		3320	6.8	3320	6.8	0.636	12.2	LOS A	9.5	69.5	0.54	0.50	0.57	47.0

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

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P2	SouthEast Full Crossing	53	21.9	LOS C	0.1	0.1	0.89	0.89
P1	SouthWest Full Crossing	53	21.9	LOS C	0.1	0.1	0.89	0.89
All Pedestrians		105	21.9	LOS C			0.89	0.89

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 4276 [Rookwood Rd / George St / Davis Ln PM - Existing]

Network: N102 [Existing PM]

Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 150 seconds (Network Site User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Rookwood Road (S)														
1	L2	183	2.9	183	2.9	0.393	13.9	LOS A	8.8	64.5	0.76	0.71	0.76	32.7
2	T1	380	7.8	380	7.8	0.393	13.6	LOS A	8.8	64.5	0.81	0.72	0.81	17.6
3	R2	31	0.0	31	0.0	0.393	19.3	LOS B	7.5	55.3	0.85	0.73	0.85	21.2
Approach		594	5.9	594	5.9	0.393	14.0	LOS A	8.8	64.5	0.80	0.72	0.80	25.6
East: Davis Lane (E)														
4	L2	42	5.0	42	5.0	0.053	9.6	LOS A	0.4	2.8	0.26	0.95	0.26	20.2
Approach		42	5.0	42	5.0	0.053	9.6	LOS A	0.4	2.8	0.26	0.95	0.26	20.2
North: Rookwood Road (N)														
7	L2	13	16.7	13	16.7	0.484	12.3	LOS A	11.4	83.5	0.60	0.54	0.60	30.1
8	T1	856	4.8	856	4.8	0.484	8.9	LOS A	11.4	83.5	0.60	0.53	0.60	28.1
Approach		868	5.0	868	5.0	0.484	8.9	LOS A	11.4	83.5	0.60	0.53	0.60	28.2
West: George Street (W)														
10	L2	77	1.4	77	1.4	0.216	31.6	LOS C	2.5	17.4	0.88	0.74	0.88	23.2
Approach		77	1.4	77	1.4	0.216	31.6	LOS C	2.5	17.4	0.88	0.74	0.88	23.2
All Vehicles		1581	5.1	1581	5.1	0.484	12.0	LOS A	11.4	83.5	0.68	0.62	0.68	26.5

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

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P3	North Full Crossing	53	31.8	LOS D	0.1	0.1	0.92	0.92
P4	West Full Crossing	53	31.8	LOS D	0.1	0.1	0.92	0.92
All Pedestrians		105	31.8	LOS D			0.92	0.92

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 61 [Hume Hwy / Rookwood Rd / Chapel Rd PM - Existing]

Network: N102 [Existing PM]

Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 150 seconds (Network User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Chapel Road (S)														
1b	L3	247	6.4	247	6.4	0.798	64.7	LOS E	22.9	168.1	1.00	0.91	1.08	20.9
2	T1	274	4.2	274	4.2	0.798	57.9	LOS E	22.9	168.1	0.96	0.82	0.98	17.7
3a	R1	7	100.0	7	100.0	0.558	58.6	LOS E	13.9	103.7	0.95	0.79	0.95	18.0
Approach		528	6.6	528	6.6	0.798	61.1	LOS E	22.9	168.1	0.98	0.87	1.03	19.4
NorthEast: Hume Highway (NE)														
24a	L1	141	6.0	141	6.0	0.807	28.2	LOS B	27.3	202.2	0.78	0.73	0.79	28.8
25	T1	1389	7.3	1389	7.3	0.807	16.5	LOS B	27.3	202.2	0.62	0.56	0.62	29.2
26b	R3	84	7.5	84	7.5	0.347	27.3	LOS B	2.8	20.8	0.73	0.72	0.73	18.8
Approach		1615	7.2	1615	7.2	0.807	18.1	LOS B	27.3	202.2	0.64	0.58	0.64	28.7
North: Rookwood Road (N)														
7b	L3	35	9.1	35	9.1	0.349	34.2	LOS C	12.2	87.9	0.65	0.59	0.65	11.4
8	T1	529	2.4	529	2.4	0.349	30.3	LOS C	12.5	89.2	0.65	0.57	0.65	26.1
9a	R1	289	13.8	289	13.8	0.997	78.2	LOS F	22.5	176.2	1.00	1.17	1.50	12.3
Approach		854	6.5	854	6.5	0.997	46.7	LOS D	22.5	176.2	0.77	0.77	0.94	20.3
SouthWest: Hume Highway (SW)														
30a	L1	166	10.8	166	10.8	0.792	48.0	LOS D	30.9	230.4	0.91	0.83	0.93	13.2
31	T1	1341	5.8	1341	5.8	0.792	46.1	LOS D	31.7	233.1	0.92	0.83	0.93	13.3
32b	R3	188	5.6	188	5.6	0.746	40.2	LOS C	8.8	64.7	1.00	0.89	1.09	25.4
Approach		1696	6.3	1696	6.3	0.792	45.6	LOS D	31.7	233.1	0.92	0.83	0.95	15.2
All Vehicles		4693	6.7	4693	6.7	0.997	38.1	LOS C	31.7	233.1	0.80	0.74	0.85	20.8

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

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
P3	North Full Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
P8	SouthWest Full Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
All Pedestrians		158	69.3	LOS F			0.96	0.96

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 1124 [Hume Hwy / Beresford Ave Dev PM - Existing]

Network: N102 [Existing PM]

Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 150 seconds (Network User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Hume Highway (E)														
5	T1	1575	6.8	1575	6.8	0.364	1.1	LOS A	4.3	31.7	0.06	0.06	0.06	36.1
6	R2	34	0.0	34	0.0	0.132	4.3	LOS A	0.1	0.7	0.04	0.46	0.04	34.0
Approach		1608	6.7	1608	6.7	0.364	1.2	LOS A	4.3	31.7	0.06	0.07	0.06	36.0
North: Beresford Avenue (N)														
7	L2	26	0.0	26	0.0	0.193	66.2	LOS E	1.8	12.3	0.91	0.73	0.91	5.8
9	R2	59	1.8	59	1.8	0.254	67.9	LOS E	3.9	28.0	0.94	0.75	0.94	5.7
Approach		85	1.2	85	1.2	0.254	67.4	LOS E	3.9	28.0	0.93	0.74	0.93	5.7
West: Hume Highway (W)														
10	L2	34	3.1	34	3.1	0.573	4.2	LOS A	1.4	10.5	0.05	0.08	0.05	39.2
11	T1	1312	6.7	1312	6.7	0.573	0.7	LOS A	1.7	12.2	0.05	0.06	0.05	38.6
Approach		1345	6.6	1345	6.6	0.573	0.8	LOS A	1.7	12.2	0.05	0.06	0.05	38.6
All Vehicles		3039	6.5	3039	6.5	0.573	2.9	LOS A	4.3	31.7	0.08	0.08	0.08	34.0

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

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P3	North Full Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
P4	West Full Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
All Pedestrians		105	69.3	LOS F			0.96	0.96

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 857 [Hume Hwy / Stacey St AM - Future Existing]

Network: N101 [Future Existing AM]

Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 150 seconds (Network Site User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Stacey Street (S)														
1	L2	74	15.7	74	15.7	0.840	44.1	LOS D	46.8	350.3	0.95	0.88	0.97	26.9
2	T1	1379	7.2	1379	7.2	0.840	38.6	LOS C	47.1	350.1	0.95	0.88	0.97	27.0
3	R2	562	8.4	562	8.4	0.963	103.9	LOS F	25.9	194.5	1.00	1.06	1.44	17.5
Approach		2015	7.8	2015	7.8	0.963	57.0	LOS E	47.1	350.3	0.96	0.93	1.10	22.7
East: Hume Highway (E)														
4	L2	565	10.8	565	10.8	0.894	43.4	LOS D	31.5	240.5	0.69	0.84	0.81	29.5
5	T1	1221	8.5	1221	8.5	0.849	60.7	LOS E	29.9	224.7	0.98	0.92	1.06	10.7
Approach		1786	9.3	1786	9.3	0.894	55.2	LOS D	31.5	240.5	0.89	0.90	0.98	17.4
North: Stacey Street (N)														
7	L2	34	12.5	34	12.5	0.078	51.1	LOS D	1.8	13.7	0.76	0.70	0.76	18.4
8	T1	883	10.6	883	10.6	0.977	91.9	LOS F	37.0	282.3	1.00	1.15	1.35	18.9
Approach		917	10.7	917	10.7	0.977	90.4	LOS F	37.0	282.3	0.99	1.14	1.33	18.9
West: Hume Highway (W)														
10	L2	31	3.4	31	3.4	0.766	36.5	LOS C	21.8	163.2	0.80	0.73	0.80	11.4
11	T1	1682	8.4	1682	8.4	0.766	30.3	LOS C	21.8	163.2	0.76	0.69	0.76	23.2
12	R2	199	9.0	199	9.0	1.115	183.4	LOS F	21.6	163.2	1.00	1.23	1.88	9.8
Approach		1912	8.4	1912	8.4	1.115	46.3	LOS D	21.8	163.2	0.79	0.75	0.88	18.4
All Vehicles		6629	8.8	6629	8.8	1.115	58.1	LOS E	47.1	350.3	0.90	0.90	1.04	19.6

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

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
P2	East Full Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
P2B	East Slip/Bypass Lane Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
P3	North Full Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
P3B	North Slip/Bypass Lane Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
All Pedestrians		263	69.3	LOS F			0.96	0.96

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 3508 [Stacey St / Beresford Ave AM - Future Existing]

Network: N101 [Future Existing AM]

Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 150 seconds (Network Site User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
SouthEast: Stacey Street (SE)														
5	T1	1355	7.1	1355	7.1	0.413	0.3	LOS A	1.6	12.0	0.04	0.03	0.04	67.6
6	R2	68	6.2	68	6.2	0.187	16.3	LOS B	1.9	13.9	0.44	0.71	0.44	39.4
Approach		1423	7.0	1423	7.0	0.413	1.1	LOS A	1.9	13.9	0.06	0.07	0.06	60.8
NorthEast: Beresford Avenue (NE)														
7	L2	27	23.1	27	23.1	0.234	68.6	LOS E	1.9	15.6	0.92	0.74	0.92	17.6
9	R2	13	8.3	13	8.3	0.154	82.4	LOS F	0.9	7.0	0.99	0.68	0.99	15.5
Approach		40	18.4	40	18.4	0.234	73.0	LOS F	1.9	15.6	0.94	0.72	0.94	16.9
NorthWest: Stacey Street (NW)														
10	L2	9	0.0	9	0.0	0.629	12.0	LOS A	12.3	93.6	0.40	0.37	0.40	48.7
11	T1	914	10.6	914	10.6	0.629	6.0	LOS A	13.4	102.5	0.42	0.39	0.42	47.3
Approach		923	10.5	923	10.5	0.629	6.1	LOS A	13.4	102.5	0.42	0.39	0.42	47.3
All Vehicles		2386	8.6	2386	8.6	0.629	4.2	LOS A	13.4	102.5	0.21	0.20	0.21	49.9

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

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P3	NorthEast Full Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
P4	NorthWest Full Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
All Pedestrians		105	69.3	LOS F			0.96	0.96

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 3509 [Stacey St / Rookwood Rd AM - Future Existing]

Network: N101 [Future Existing AM]

Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 80 seconds (Site User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
SouthEast: Stacey Street (SE)														
4	L2	61	0.0	61	0.0	0.527	23.0	LOS B	12.5	92.6	0.75	0.69	0.92	29.9
5	T1	1341	7.3	1341	7.3	0.527	16.0	LOS B	12.8	95.0	0.75	0.67	0.80	47.3
Approach		1402	7.0	1402	7.0	0.527	16.3	LOS B	12.8	95.0	0.75	0.67	0.81	46.9
NorthWest: Rookwood Road (NW)														
11	T1	909	10.4	909	10.4	0.273	0.1	LOS A	0.5	3.6	0.03	0.02	0.03	69.5
12	R2	434	8.7	434	8.7	0.354	27.6	LOS B	6.3	47.8	0.79	0.79	0.79	31.2
Approach		1343	9.9	1343	9.9	0.354	9.0	LOS A	6.3	47.8	0.27	0.27	0.27	49.7
SouthWest: Rookwood Road (SW)														
1	L2	698	5.0	698	5.0	0.556	28.5	LOS B	11.1	81.3	0.86	0.82	0.86	34.5
Approach		698	5.0	698	5.0	0.556	28.5	LOS B	11.1	81.3	0.86	0.82	0.86	34.5
All Vehicles		3443	7.7	3443	7.7	0.556	15.9	LOS B	12.8	95.0	0.59	0.54	0.61	43.9

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

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P2	SouthEast Full Crossing	53	34.3	LOS D	0.1	0.1	0.93	0.93
P1	SouthWest Full Crossing	53	34.3	LOS D	0.1	0.1	0.93	0.93
All Pedestrians		105	34.3	LOS D			0.93	0.93

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 4276 [Rookwood Rd / George St / Davis Ln AM - Future Existing]

Network: N101 [Future Existing AM]

Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 150 seconds (Network Site User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Rookwood Road (S)														
1	L2	127	1.7	127	1.7	0.315	14.2	LOS A	6.9	51.1	0.72	0.67	0.72	32.6
2	T1	419	10.1	419	10.1	0.315	10.5	LOS A	6.9	51.1	0.71	0.63	0.71	20.2
3	R2	9	0.0	9	0.0	0.315	13.8	LOS A	6.8	51.5	0.71	0.61	0.71	25.4
Approach		556	8.0	556	8.0	0.315	11.4	LOS A	6.9	51.5	0.71	0.64	0.71	26.0
East: Davis Lane (E)														
4	L2	82	1.3	82	1.3	0.285	31.2	LOS C	3.4	24.0	0.88	0.74	0.88	8.6
5	T1	24	0.0	24	0.0	0.285	27.8	LOS B	3.4	24.0	0.88	0.74	0.88	24.9
Approach		106	1.0	106	1.0	0.285	30.4	LOS C	3.4	24.0	0.88	0.74	0.88	14.8
North: Rookwood Road (N)														
7	L2	15	0.0	15	0.0	0.240	10.7	LOS A	4.6	34.1	0.49	0.43	0.49	31.9
8	T1	525	7.8	525	7.8	0.240	7.3	LOS A	4.6	34.4	0.49	0.43	0.49	29.7
Approach		540	7.6	540	7.6	0.240	7.4	LOS A	4.6	34.4	0.49	0.43	0.49	29.8
West: George Street (W)														
10	L2	252	1.7	252	1.7	0.709	35.6	LOS C	9.1	64.8	0.99	0.84	1.00	22.0
Approach		252	1.7	252	1.7	0.709	35.6	LOS C	9.1	64.8	0.99	0.84	1.00	22.0
All Vehicles		1454	6.2	1454	6.2	0.709	15.5	LOS B	9.1	64.8	0.69	0.60	0.69	24.7

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

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	53	31.8	LOS D	0.1	0.1	0.92	0.92
P2	East Full Crossing	53	31.8	LOS D	0.1	0.1	0.92	0.92
P3	North Full Crossing	53	31.8	LOS D	0.1	0.1	0.92	0.92
P4	West Full Crossing	53	31.8	LOS D	0.1	0.1	0.92	0.92
All Pedestrians		211	31.8	LOS D			0.92	0.92

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

Future Existing.sip8

MOVEMENT SUMMARY

Site: 61 [Hume Hwy / Rookwood Rd / Chapel Rd AM - Future Existing]

Network: N101 [Future Existing AM]

Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 150 seconds (Network Site User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Chapel Road (S)														
1b	L3	238	4.4	238	4.4	0.889	77.9	LOS F	27.1	195.8	1.00	1.01	1.22	19.0
2	T1	316	2.7	316	2.7	0.889	63.2	LOS E	27.1	195.8	0.98	0.87	1.04	16.9
3a	R1	9	100.0	9	100.0	0.622	60.3	LOS E	15.4	114.2	0.97	0.81	0.97	17.7
Approach		563	5.0	563	5.0	0.889	69.4	LOS E	27.1	195.8	0.99	0.93	1.12	17.9
NorthEast: Hume Highway (NE)														
24a	L1	165	7.6	165	7.6	0.525	41.4	LOS C	25.1	188.4	0.90	0.81	0.90	25.2
25	T1	1093	9.3	1093	9.3	0.525	41.1	LOS C	26.9	203.1	0.94	0.83	0.94	20.8
26b	R3	53	2.0	53	2.0	0.285	37.0	LOS C	1.8	12.9	0.90	0.74	0.90	15.8
Approach		1311	8.8	1311	8.8	0.525	41.0	LOS C	26.9	203.1	0.93	0.82	0.93	21.3
North: Rookwood Road (N)														
7b	L3	87	0.0	87	0.0	0.338	39.9	LOS C	11.5	82.0	0.76	0.70	0.76	9.9
8	T1	368	2.9	368	2.9	0.338	35.9	LOS C	11.5	82.0	0.71	0.62	0.71	24.4
9a	R1	161	12.4	161	12.4	0.676	39.0	LOS C	8.2	63.2	0.95	0.78	0.96	19.1
Approach		617	4.9	617	4.9	0.676	37.3	LOS C	11.5	82.0	0.78	0.67	0.78	21.9
SouthWest: Hume Highway (SW)														
30a	L1	244	10.8	244	10.8	0.928	53.1	LOS D	57.8	434.8	1.00	1.01	1.13	12.3
31	T1	1860	7.8	1860	7.8	0.928	50.0	LOS D	57.8	434.8	0.92	0.95	1.07	12.5
32b	R3	258	4.9	258	4.9	1.068	146.4	LOS F	24.4	178.2	1.00	1.34	1.88	11.2
Approach		2362	7.8	2362	7.8	1.068	60.8	LOS E	57.8	434.8	0.94	1.00	1.16	12.1
All Vehicles		4853	7.4	4853	7.4	1.068	53.5	LOS D	57.8	434.8	0.92	0.90	1.05	16.5

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

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
P3	North Full Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
P8	SouthWest Full Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
All Pedestrians		158	69.3	LOS F			0.96	0.96

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 1124 [Hume Hwy / Beresford Ave AM - Future Existing]

Network: N101 [Future Existing AM]

Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 150 seconds (Network User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Hume Highway (E)														
5	T1	1303	9.0	1303	9.0	0.305	1.0	LOS A	3.2	23.7	0.06	0.05	0.06	36.4
Approach		1303	9.0	1303	9.0	0.305	1.0	LOS A	3.2	23.7	0.06	0.05	0.06	36.4
North: Beresford Avenue (N)														
7	L2	1	0.0	1	0.0	0.004	62.4	LOS E	0.0	0.2	0.87	0.58	0.87	6.1
Approach		1	0.0	1	0.0	0.004	62.4	LOS E	0.0	0.2	0.87	0.58	0.87	6.1
West: Hume Highway (W)														
10	L2	118	0.0	118	0.0	0.906	23.1	LOS B	25.1	185.9	0.34	0.45	0.45	24.9
11	T1	1882	8.3	1882	8.3	0.906	22.0	LOS B	28.7	215.5	0.41	0.49	0.53	20.4
Approach		2000	7.8	2000	7.8	0.906	22.1	LOS B	28.7	215.5	0.40	0.49	0.52	20.7
All Vehicles		3304	8.3	3304	8.3	0.906	13.8	LOS A	28.7	215.5	0.27	0.32	0.34	22.8

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

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P3	North Full Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
P4	West Full Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
All Pedestrians		105	69.3	LOS F			0.96	0.96

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 857 [Hume Hwy / Stacey St PM - Future Existing]

Network: N102 [Future Existing PM]

Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 150 seconds (Network User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Stacey Street (S)														
1	L2	137	9.2	137	9.2	0.611	32.4	LOS C	29.3	218.9	0.76	0.72	0.76	31.8
2	T1	1025	7.6	1025	7.6	0.611	27.1	LOS B	29.7	221.6	0.76	0.70	0.76	32.0
3	R2	393	9.1	393	9.1	0.938	98.8	LOS F	17.2	129.7	1.00	1.03	1.43	18.1
Approach		1555	8.1	1555	8.1	0.938	45.7	LOS D	29.7	221.6	0.82	0.79	0.93	25.7
East: Hume Highway (E)														
4	L2	557	9.1	557	9.1	0.941	60.4	LOS E	37.7	284.7	0.76	0.91	0.98	24.7
5	T1	1341	7.2	1341	7.2	0.925	71.1	LOS F	38.9	289.3	0.98	1.02	1.18	9.4
Approach		1898	7.8	1898	7.8	0.941	68.0	LOS E	38.9	289.3	0.91	0.99	1.12	14.6
North: Stacey Street (N)														
7	L2	42	2.5	42	2.5	0.067	40.2	LOS C	2.1	14.9	0.72	0.71	0.72	21.8
8	T1	1149	8.0	1149	8.0	0.916	66.2	LOS E	37.8	282.3	1.00	1.04	1.18	23.3
Approach		1192	7.8	1192	7.8	0.916	65.3	LOS E	37.8	282.3	0.99	1.03	1.17	23.3
West: Hume Highway (W)														
10	L2	25	16.7	25	16.7	0.563	55.7	LOS D	22.0	163.2	0.97	0.86	0.97	7.6
11	T1	1135	6.6	1135	6.6	0.563	49.7	LOS D	22.1	163.2	0.97	0.85	0.97	16.7
12	R2	104	7.1	104	7.1	0.884	79.6	LOS F	8.0	59.7	1.00	0.84	1.13	19.0
Approach		1264	6.8	1264	6.8	0.884	52.3	LOS D	22.1	163.2	0.97	0.85	0.98	16.9
All Vehicles		5908	7.7	5908	7.7	0.941	58.2	LOS E	38.9	289.3	0.92	0.91	1.05	19.9

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

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
P2	East Full Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
P2B	East Slip/Bypass Lane Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
P3	North Full Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
P3B	North Slip/Bypass Lane Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
All Pedestrians		263	69.3	LOS F			0.96	0.96

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 3508 [Stacey St / Beresford Ave PM - Future Existing]

Network: N102 [Future Existing PM]

Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 150 seconds (Network Site User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
SouthEast: Stacey Street (SE)														
5	T1	926	6.5	926	6.5	0.304	2.8	LOS A	5.7	41.9	0.18	0.17	0.18	54.2
6	R2	99	16.0	99	16.0	0.536	20.5	LOS B	2.9	22.8	0.41	0.71	0.41	36.9
Approach		1025	7.4	1025	7.4	0.536	4.5	LOS A	5.7	41.9	0.21	0.22	0.21	47.8
NorthEast: Beresford Avenue (NE)														
7	L2	113	14.0	113	14.0	0.719	70.5	LOS E	8.3	64.9	0.98	0.88	1.10	17.3
9	R2	55	11.5	55	11.5	0.319	74.1	LOS F	3.8	29.4	0.97	0.75	0.97	16.7
Approach		167	13.2	167	13.2	0.719	71.6	LOS F	8.3	64.9	0.97	0.84	1.06	17.1
NorthWest: Stacey Street (NW)														
10	L2	29	14.3	29	14.3	0.849	28.7	LOS C	31.9	237.5	0.69	0.71	0.76	37.3
11	T1	1142	7.2	1142	7.2	0.849	23.3	LOS B	34.4	255.5	0.73	0.74	0.80	24.6
Approach		1172	7.4	1172	7.4	0.849	23.4	LOS B	34.4	255.5	0.73	0.74	0.80	25.3
All Vehicles		2364	7.8	2364	7.8	0.849	18.6	LOS B	34.4	255.5	0.52	0.52	0.56	28.5

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

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P3	NorthEast Full Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
P4	NorthWest Full Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
All Pedestrians		105	69.3	LOS F			0.96	0.96

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 3509 [Stacey St / Rookwood Rd PM - Future Existing]

Network: N102 [Future Existing PM]

Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 55 seconds (Site User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
SouthEast: Stacey Street (SE)														
4	L2	85	3.7	85	3.7	0.450	20.7	LOS B	6.0	44.3	0.78	0.74	1.06	31.5
5	T1	882	7.2	882	7.2	0.450	14.0	LOS A	6.6	48.7	0.79	0.69	0.87	49.1
Approach		967	6.9	967	6.9	0.450	14.6	LOS B	6.6	48.7	0.79	0.69	0.88	48.2
NorthWest: Rookwood Road (NW)														
11	T1	1159	6.7	1159	6.7	0.355	0.1	LOS A	0.5	3.5	0.03	0.03	0.03	69.5
12	R2	824	5.9	824	5.9	0.636	22.7	LOS B	9.5	69.5	0.88	0.83	0.88	34.6
Approach		1983	6.4	1983	6.4	0.636	9.5	LOS A	9.5	69.5	0.39	0.36	0.39	48.9
SouthWest: Rookwood Road (SW)														
1	L2	416	7.6	416	7.6	0.325	19.6	LOS B	4.1	30.8	0.76	0.77	0.76	39.3
Approach		416	7.6	416	7.6	0.325	19.6	LOS B	4.1	30.8	0.76	0.77	0.76	39.3
All Vehicles		3366	6.7	3366	6.7	0.636	12.2	LOS A	9.5	69.5	0.55	0.51	0.58	46.9

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

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P2	SouthEast Full Crossing	53	21.9	LOS C	0.1	0.1	0.89	0.89
P1	SouthWest Full Crossing	53	21.9	LOS C	0.1	0.1	0.89	0.89
All Pedestrians		105	21.9	LOS C			0.89	0.89

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 4276 [Rookwood Rd / George St / Davis Ln PM - Future Existing]

Network: N102 [Future Existing PM]

Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 150 seconds (Network Site User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Rookwood Road (S)														
1	L2	183	2.9	183	2.9	0.355	16.2	LOS B	8.0	58.2	0.80	0.74	0.80	31.4
2	T1	380	7.8	380	7.8	0.355	12.3	LOS A	8.0	58.2	0.79	0.69	0.79	18.7
3	R2	9	0.0	9	0.0	0.355	15.7	LOS B	7.8	57.9	0.79	0.67	0.79	23.9
Approach		573	6.1	573	6.1	0.355	13.6	LOS A	8.0	58.2	0.79	0.71	0.79	26.0
East: Davis Lane (E)														
4	L2	84	2.5	84	2.5	0.310	31.4	LOS C	3.7	26.5	0.89	0.74	0.89	8.6
5	T1	32	0.0	32	0.0	0.310	28.0	LOS B	3.7	26.5	0.89	0.74	0.89	24.9
Approach		116	1.8	116	1.8	0.310	30.5	LOS C	3.7	26.5	0.89	0.74	0.89	15.8
North: Rookwood Road (N)														
7	L2	9	22.2	9	22.2	0.534	12.7	LOS A	13.1	95.7	0.63	0.56	0.63	29.6
8	T1	905	4.5	905	4.5	0.534	9.3	LOS A	13.1	95.7	0.63	0.56	0.63	27.8
Approach		915	4.7	915	4.7	0.534	9.3	LOS A	13.1	95.7	0.63	0.56	0.63	27.8
West: George Street (W)														
10	L2	77	1.4	77	1.4	0.216	31.6	LOS C	2.5	17.4	0.88	0.74	0.88	23.2
Approach		77	1.4	77	1.4	0.216	31.6	LOS C	2.5	17.4	0.88	0.74	0.88	23.2
All Vehicles		1680	4.8	1680	4.8	0.534	13.3	LOS A	13.1	95.7	0.71	0.63	0.71	25.6

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

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	53	31.8	LOS D	0.1	0.1	0.92	0.92
P2	East Full Crossing	53	31.8	LOS D	0.1	0.1	0.92	0.92
P3	North Full Crossing	53	31.8	LOS D	0.1	0.1	0.92	0.92
P4	West Full Crossing	53	31.8	LOS D	0.1	0.1	0.92	0.92
All Pedestrians		211	31.8	LOS D			0.92	0.92

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

Future Existing.sip8

MOVEMENT SUMMARY

Site: 61 [Hume Hwy / Rookwood Rd / Chapel Rd PM - Future Existing]

Network: N102 [Future Existing PM]

Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 150 seconds (Network User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Chapel Road (S)														
1b	L3	247	6.4	247	6.4	0.757	60.4	LOS E	21.8	160.6	0.98	0.88	1.02	21.6
2	T1	274	4.2	274	4.2	0.757	55.3	LOS D	21.8	160.6	0.94	0.81	0.95	18.2
3a	R1	7	100.0	7	100.0	0.530	56.6	LOS E	13.7	102.1	0.93	0.78	0.93	18.4
Approach		528	6.6	528	6.6	0.757	57.8	LOS E	21.8	160.6	0.96	0.84	0.98	20.0
NorthEast: Hume Highway (NE)														
24a	L1	127	6.6	127	6.6	0.768	22.5	LOS B	22.4	166.7	0.67	0.63	0.67	30.7
25	T1	1376	7.4	1376	7.4	0.768	10.1	LOS A	22.4	166.7	0.42	0.38	0.42	32.5
26b	R3	84	7.5	84	7.5	0.389	27.3	LOS B	2.9	21.3	0.73	0.72	0.73	18.7
Approach		1587	7.4	1587	7.4	0.768	12.0	LOS A	22.4	166.7	0.46	0.42	0.46	31.7
North: Rookwood Road (N)														
7b	L3	95	3.3	95	3.3	0.420	34.7	LOS C	15.4	110.4	0.69	0.65	0.69	11.2
8	T1	579	2.2	579	2.2	0.420	30.8	LOS C	15.4	110.4	0.68	0.61	0.68	25.9
9a	R1	303	13.2	303	13.2	1.047	102.4	LOS F	24.3	189.3	1.00	1.24	1.57	8.6
Approach		977	5.7	977	5.7	1.047	53.4	LOS D	24.3	189.3	0.78	0.81	0.96	17.3
SouthWest: Hume Highway (SW)														
30a	L1	138	13.0	138	13.0	0.762	45.6	LOS D	29.6	221.0	0.89	0.80	0.89	13.7
31	T1	1369	5.7	1369	5.7	0.762	43.1	LOS D	30.3	222.6	0.89	0.79	0.89	13.9
32b	R3	188	5.6	188	5.6	0.815	46.3	LOS D	9.9	72.7	0.99	0.95	1.19	24.0
Approach		1696	6.3	1696	6.3	0.815	43.6	LOS D	30.3	222.6	0.90	0.81	0.92	15.7
All Vehicles		4788	6.6	4788	6.6	1.047	36.7	LOS C	30.3	222.6	0.73	0.68	0.78	20.7

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

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
P3	North Full Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
P8	SouthWest Full Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
All Pedestrians		158	69.3	LOS F			0.96	0.96

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 1124 [Hume Hwy / Beresford Ave PM - Future Existing]

Network: N102 [Future Existing PM]

Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 150 seconds (Network User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Hume Highway (E)														
5	T1	1575	6.8	1575	6.8	0.364	1.0	LOS A	3.7	27.5	0.06	0.05	0.06	36.4
Approach		1575	6.8	1575	6.8	0.364	1.0	LOS A	3.7	27.5	0.06	0.05	0.06	36.4
North: Beresford Avenue (N)														
7	L2	1	0.0	1	0.0	0.004	62.4	LOS E	0.0	0.2	0.87	0.58	0.87	6.1
Approach		1	0.0	1	0.0	0.004	62.4	LOS E	0.0	0.2	0.87	0.58	0.87	6.1
West: Hume Highway (W)														
10	L2	112	0.9	112	0.9	0.629	5.7	LOS A	5.1	37.4	0.15	0.23	0.15	36.9
11	T1	1322	6.6	1322	6.6	0.629	1.3	LOS A	5.1	37.4	0.08	0.10	0.08	37.6
Approach		1434	6.2	1434	6.2	0.629	1.6	LOS A	5.1	37.4	0.09	0.11	0.09	37.5
All Vehicles		3009	6.5	3009	6.5	0.629	1.3	LOS A	5.1	37.4	0.07	0.08	0.07	37.1

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

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P3	North Full Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
P4	West Full Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
All Pedestrians		105	69.3	LOS F			0.96	0.96

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 857 [Hume Hwy / Stacey St AM - Development]

Network: N101 [Development AM]

Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 150 seconds (Network Site User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Stacey Street (S)														
1	L2	83	13.9	83	13.9	0.908	56.6	LOS E	59.9	446.5	1.00	1.00	1.11	22.9
2	T1	1432	6.9	1432	6.9	0.908	50.8	LOS D	59.9	446.5	0.97	0.98	1.09	23.0
3	R2	562	8.4	562	8.4	0.963	103.9	LOS F	25.9	194.5	1.00	1.06	1.44	17.5
Approach		2077	7.6	2077	7.6	0.963	65.4	LOS E	59.9	446.5	0.98	1.00	1.19	20.8
East: Hume Highway (E)														
4	L2	565	10.8	565	10.8	0.894	43.4	LOS D	31.5	240.6	0.69	0.84	0.81	29.5
5	T1	1222	8.5	1222	8.5	0.849	60.8	LOS E	30.0	225.1	0.98	0.92	1.07	10.7
Approach		1787	9.2	1787	9.2	0.894	55.3	LOS D	31.5	240.6	0.89	0.90	0.98	17.4
North: Stacey Street (N)														
7	L2	34	12.5	34	12.5	0.078	51.1	LOS D	1.8	13.7	0.76	0.70	0.76	18.4
8	T1	883	10.6	883	10.6	0.977	91.9	LOS F	37.0	282.3	1.00	1.15	1.35	18.9
Approach		917	10.7	917	10.7	0.977	90.4	LOS F	37.0	282.3	0.99	1.14	1.33	18.9
West: Hume Highway (W)														
10	L2	38	2.8	38	2.8	0.779	38.5	LOS C	21.8	163.2	0.83	0.76	0.83	10.9
11	T1	1684	8.4	1684	8.4	0.779	32.8	LOS C	21.8	163.2	0.80	0.72	0.80	22.1
12	R2	233	7.7	233	7.7	1.275	319.1	LOS F	21.9	163.2	1.00	1.50	2.45	6.0
Approach		1955	8.2	1955	8.2	1.275	67.0	LOS E	21.9	163.2	0.82	0.81	1.00	14.1
All Vehicles		6736	8.6	6736	8.6	1.275	66.6	LOS E	59.9	446.5	0.91	0.94	1.10	17.9

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

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
P2	East Full Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
P2B	East Slip/Bypass Lane Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
P3	North Full Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
P3B	North Slip/Bypass Lane Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
All Pedestrians		263	69.3	LOS F			0.96	0.96

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 3508 [Stacey St / Beresford Ave AM - Development]

Network: N101 [Development AM]

Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 150 seconds (Network Site User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
SouthEast: Stacey Street (SE)														
5	T1	1415	6.8	1415	6.8	0.430	0.3	LOS A	1.7	12.9	0.04	0.03	0.04	67.5
6	R2	68	6.2	68	6.2	0.187	15.9	LOS B	1.8	13.4	0.42	0.70	0.42	39.7
Approach		1483	6.7	1483	6.7	0.430	1.1	LOS A	1.8	13.4	0.06	0.07	0.06	61.1
NorthEast: Beresford Avenue (NE)														
7	L2	27	23.1	27	23.1	0.234	68.6	LOS E	1.9	15.6	0.92	0.74	0.92	17.6
9	R2	13	8.3	13	8.3	0.154	82.4	LOS F	0.9	7.0	0.99	0.68	0.99	15.5
Approach		40	18.4	40	18.4	0.234	73.0	LOS F	1.9	15.6	0.94	0.72	0.94	16.9
NorthWest: Stacey Street (NW)														
10	L2	9	0.0	9	0.0	0.629	12.0	LOS A	12.3	93.6	0.40	0.37	0.40	48.7
11	T1	914	10.6	914	10.6	0.629	6.0	LOS A	13.4	102.5	0.42	0.39	0.42	47.3
Approach		923	10.5	923	10.5	0.629	6.1	LOS A	13.4	102.5	0.42	0.39	0.42	47.3
All Vehicles		2446	8.3	2446	8.3	0.629	4.1	LOS A	13.4	102.5	0.21	0.20	0.21	50.2

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

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P3	NorthEast Full Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
P4	NorthWest Full Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
All Pedestrians		105	69.3	LOS F			0.96	0.96

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 3509 [Stacey St / Rookwood Rd AM - Development]

Network: N101 [Development AM]

Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 80 seconds (Site User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
SouthEast: Stacey Street (SE)														
4	L2	121	0.0	121	0.0	0.548	22.4	LOS B	13.0	95.2	0.75	0.72	0.92	29.8
5	T1	1341	7.3	1341	7.3	0.548	16.0	LOS B	13.5	100.1	0.76	0.69	0.81	47.2
Approach		1462	6.7	1462	6.7	0.548	16.5	LOS B	13.5	100.1	0.76	0.69	0.82	46.3
NorthWest: Rookwood Road (NW)														
11	T1	909	10.4	909	10.4	0.273	0.1	LOS A	0.5	3.6	0.03	0.02	0.03	69.5
12	R2	439	8.6	439	8.6	0.358	27.6	LOS B	6.4	48.4	0.79	0.79	0.79	31.2
Approach		1348	9.8	1348	9.8	0.358	9.1	LOS A	6.4	48.4	0.28	0.27	0.28	49.6
SouthWest: Rookwood Road (SW)														
1	L2	698	5.0	698	5.0	0.556	28.5	LOS B	11.1	81.3	0.86	0.82	0.86	34.5
Approach		698	5.0	698	5.0	0.556	28.5	LOS B	11.1	81.3	0.86	0.82	0.86	34.5
All Vehicles		3508	7.6	3508	7.6	0.556	16.0	LOS B	13.5	100.1	0.59	0.55	0.62	43.7

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

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P2	SouthEast Full Crossing	53	34.3	LOS D	0.1	0.1	0.93	0.93
P1	SouthWest Full Crossing	53	34.3	LOS D	0.1	0.1	0.93	0.93
All Pedestrians		105	34.3	LOS D			0.93	0.93

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 4276 [Rookwood Rd / George St / Davis Ln AM - Development]

Network: N101 [Development AM]

Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 150 seconds (Network Site User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Rookwood Road (S)														
1	L2	111	1.9	111	1.9	0.305	14.5	LOS B	6.9	51.0	0.73	0.67	0.73	32.6
2	T1	419	10.1	419	10.1	0.305	10.8	LOS A	6.9	51.0	0.73	0.64	0.73	20.0
3	R2	9	0.0	9	0.0	0.305	14.1	LOS A	6.7	51.1	0.72	0.62	0.72	25.2
Approach		539	8.2	539	8.2	0.305	11.6	LOS A	6.9	51.1	0.73	0.65	0.73	25.4
East: Davis Lane (E)														
4	L2	181	0.6	181	0.6	0.637	33.9	LOS C	7.9	55.7	0.97	0.81	0.97	8.1
5	T1	45	0.0	45	0.0	0.637	30.4	LOS C	7.9	55.7	0.97	0.81	0.97	24.1
Approach		226	0.5	226	0.5	0.637	33.2	LOS C	7.9	55.7	0.97	0.81	0.97	13.4
North: Rookwood Road (N)														
7	L2	15	0.0	15	0.0	0.274	10.9	LOS A	5.1	37.7	0.50	0.44	0.50	31.8
8	T1	587	7.0	587	7.0	0.274	7.4	LOS A	5.4	40.1	0.50	0.44	0.50	29.5
Approach		602	6.8	602	6.8	0.274	7.5	LOS A	5.4	40.1	0.50	0.44	0.50	29.6
West: George Street (W)														
10	L2	252	1.7	252	1.7	0.709	35.6	LOS C	9.1	64.8	0.99	0.84	1.00	22.0
Approach		252	1.7	252	1.7	0.709	35.6	LOS C	9.1	64.8	0.99	0.84	1.00	22.0
All Vehicles		1619	5.6	1619	5.6	0.709	16.8	LOS B	9.1	64.8	0.72	0.62	0.72	23.4

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

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	53	31.8	LOS D	0.1	0.1	0.92	0.92
P2	East Full Crossing	53	31.8	LOS D	0.1	0.1	0.92	0.92
P3	North Full Crossing	53	31.8	LOS D	0.1	0.1	0.92	0.92
P4	West Full Crossing	53	31.8	LOS D	0.1	0.1	0.92	0.92
All Pedestrians		211	31.8	LOS D			0.92	0.92

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

Future Development.sip8

MOVEMENT SUMMARY

Site: 61 [Hume Hwy / Rookwood Rd / Chapel Rd AM - Development]

Network: N101 [Development AM]

Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 150 seconds (Network Site User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Chapel Road (S)														
1b	L3	238	4.4	238	4.4	0.532	51.2	LOS D	15.0	108.7	0.89	0.81	0.89	23.2
2	T1	316	2.7	316	2.7	0.848	68.6	LOS E	24.3	178.2	1.00	0.97	1.14	16.2
3a	R1	9	100.0	9	100.0	0.848	70.8	LOS F	24.3	178.2	1.00	0.98	1.15	16.1
Approach		563	5.0	563	5.0	0.848	61.3	LOS E	24.3	178.2	0.95	0.90	1.03	19.2
NorthEast: Hume Highway (NE)														
24a	L1	155	8.2	155	8.2	0.527	40.8	LOS C	24.9	187.9	0.89	0.81	0.89	25.4
25	T1	1096	9.3	1096	9.3	0.527	42.0	LOS C	27.1	204.6	0.93	0.83	0.93	20.6
26b	R3	36	2.9	36	2.9	0.197	38.0	LOS C	1.2	8.9	0.90	0.72	0.90	15.5
Approach		1286	9.0	1286	9.0	0.527	41.8	LOS C	27.1	204.6	0.93	0.82	0.93	21.2
North: Rookwood Road (N)														
7b	L3	147	0.0	147	0.0	0.429	43.1	LOS D	16.5	117.0	0.87	0.78	0.87	9.2
8	T1	425	2.5	425	2.5	0.429	38.6	LOS C	16.5	117.0	0.78	0.68	0.78	23.7
9a	R1	181	11.0	181	11.0	0.689	39.0	LOS C	9.4	71.8	0.95	0.80	0.96	19.1
Approach		754	4.1	754	4.1	0.689	39.6	LOS C	16.5	117.0	0.84	0.73	0.84	20.9
SouthWest: Hume Highway (SW)														
30a	L1	244	10.8	244	10.8	0.948	59.6	LOS E	62.4	469.1	1.00	1.05	1.18	11.3
31	T1	1933	7.5	1933	7.5	0.948	56.9	LOS E	63.4	472.4	0.94	1.01	1.13	11.5
32b	R3	258	4.9	258	4.9	1.065	144.2	LOS F	24.2	176.7	1.00	1.34	1.87	11.3
Approach		2435	7.6	2435	7.6	1.065	66.5	LOS E	63.4	472.4	0.95	1.04	1.21	11.4
All Vehicles		5038	7.1	5038	7.1	1.065	55.6	LOS D	63.4	472.4	0.93	0.92	1.06	16.0

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

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
P3	North Full Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
P8	SouthWest Full Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
All Pedestrians		158	69.3	LOS F			0.96	0.96

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 1124 [Hume Hwy / Beresford Ave AM - Development]

Network: N101 [Development AM]

Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 150 seconds (Network User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Hume Highway (E)														
5	T1	1303	9.0	1303	9.0	0.305	1.1	LOS A	3.7	27.9	0.06	0.06	0.06	36.0
Approach		1303	9.0	1303	9.0	0.305	1.1	LOS A	3.7	27.9	0.06	0.06	0.06	36.0
North: Beresford Avenue (N)														
7	L2	15	0.0	15	0.0	0.054	64.2	LOS E	0.5	3.3	0.89	0.67	0.89	5.9
Approach		15	0.0	15	0.0	0.054	64.2	LOS E	0.5	3.3	0.89	0.67	0.89	5.9
West: Hume Highway (W)														
10	L2	224	0.0	224	0.0	0.934	31.0	LOS C	37.7	277.0	0.47	0.63	0.62	21.5
11	T1	1887	8.3	1887	8.3	0.934	31.4	LOS C	37.7	277.0	0.51	0.64	0.68	16.9
Approach		2112	7.4	2112	7.4	0.934	31.3	LOS C	37.7	278.8	0.51	0.64	0.68	17.4
All Vehicles		3429	8.0	3429	8.0	0.934	20.0	LOS B	37.7	278.8	0.34	0.42	0.44	19.4

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

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P3	North Full Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
P4	West Full Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
All Pedestrians		105	69.3	LOS F			0.96	0.96

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 1124 [Hume Hwy / Beresford Ave AM - Development]

Network: N101 [Development AM]

Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 150 seconds (Network User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Aver. Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Hume Highway (E)														
5	T1	1303	9.0	1303	9.0	0.305	1.1	LOS A	2.3	17.1	0.06	0.06	0.06	36.0
Approach		1303	9.0	1303	9.0	0.305	1.1	LOS A	2.3	17.1	0.06	0.06	0.06	36.0
North: Beresford Avenue (N)														
7	L2	15	0.0	15	0.0	0.054	64.2	LOS E	0.3	2.0	0.89	0.67	0.89	5.9
Approach		15	0.0	15	0.0	0.054	64.2	LOS E	0.3	2.0	0.89	0.67	0.89	5.9
West: Hume Highway (W)														
10	L2	224	0.0	224	0.0	0.934	31.0	LOS C	23.1	169.7	0.47	0.63	0.62	21.5
11	T1	1887	8.3	1887	8.3	0.934	31.4	LOS C	23.1	169.7	0.51	0.64	0.68	16.9
Approach		2112	7.4	2112	7.4	0.934	31.3	LOS C	23.1	170.8	0.51	0.64	0.68	17.4
All Vehicles		3429	8.0	3429	8.0	0.934	20.0	LOS B	23.1	170.8	0.34	0.42	0.44	19.4

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

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate
P3	North Full Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
P4	West Full Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
All Pedestrians		105	69.3	LOS F			0.96	0.96

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 857 [Hume Hwy / Stacey St PM - Development]

Network: N102 [Development PM]

Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 150 seconds (Network User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Stacey Street (S)														
1	L2	149	8.5	149	8.5	0.647	33.8	LOS C	31.7	236.6	0.79	0.74	0.79	31.0
2	T1	1066	7.3	1066	7.3	0.647	28.4	LOS B	32.2	239.3	0.79	0.73	0.79	31.3
3	R2	393	9.1	393	9.1	0.938	98.8	LOS F	17.2	129.7	1.00	1.03	1.43	18.1
Approach		1608	7.9	1608	7.9	0.938	46.1	LOS D	32.2	239.3	0.84	0.80	0.95	25.6
East: Hume Highway (E)														
4	L2	557	9.1	557	9.1	0.943	61.9	LOS E	38.5	290.3	0.78	0.92	1.00	24.4
5	T1	1342	7.2	1342	7.2	0.954	80.5	LOS F	42.0	312.2	0.98	1.08	1.26	8.5
Approach		1899	7.8	1899	7.8	0.954	75.0	LOS F	42.0	312.2	0.92	1.03	1.18	13.6
North: Stacey Street (N)														
7	L2	42	2.5	42	2.5	0.068	40.9	LOS C	2.1	15.1	0.73	0.71	0.73	21.6
8	T1	1149	8.0	1149	8.0	0.934	72.3	LOS F	37.8	282.3	1.00	1.08	1.23	22.1
Approach		1192	7.8	1192	7.8	0.934	71.2	LOS F	37.8	282.3	0.99	1.06	1.21	22.1
West: Hume Highway (W)														
10	L2	33	12.9	33	12.9	0.568	49.9	LOS D	22.0	163.2	0.95	0.84	0.95	8.5
11	T1	1137	6.6	1137	6.6	0.568	44.1	LOS D	22.1	163.2	0.95	0.83	0.95	18.2
12	R2	139	5.3	139	5.3	0.971	85.3	LOS F	11.4	83.3	1.00	0.92	1.26	18.1
Approach		1308	6.6	1308	6.6	0.971	48.6	LOS D	22.1	163.2	0.95	0.84	0.98	18.0
All Vehicles		6007	7.5	6007	7.5	0.971	60.8	LOS E	42.0	312.2	0.92	0.94	1.08	19.3

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

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
P2	East Full Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
P2B	East Slip/Bypass Lane Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
P3	North Full Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
P3B	North Slip/Bypass Lane Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
All Pedestrians		263	69.3	LOS F			0.96	0.96

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 3508 [Stacey St / Beresford Ave PM - Development]

Network: N102 [Development PM]

Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 150 seconds (Network Site User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
SouthEast: Stacey Street (SE)														
5	T1	975	6.2	975	6.2	0.320	2.8	LOS A	6.1	44.8	0.19	0.17	0.19	54.0
6	R2	99	16.0	99	16.0	0.536	19.2	LOS B	2.6	21.0	0.38	0.70	0.38	37.6
Approach		1074	7.1	1074	7.1	0.536	4.3	LOS A	6.1	44.8	0.21	0.22	0.21	48.3
NorthEast: Beresford Avenue (NE)														
7	L2	113	14.0	113	14.0	0.719	70.5	LOS E	8.3	64.9	0.98	0.88	1.10	17.3
9	R2	55	11.5	55	11.5	0.319	74.1	LOS F	3.8	29.4	0.97	0.75	0.97	16.7
Approach		167	13.2	167	13.2	0.719	71.6	LOS F	8.3	64.9	0.97	0.84	1.06	17.1
NorthWest: Stacey Street (NW)														
10	L2	29	14.3	29	14.3	0.849	28.7	LOS C	31.9	237.5	0.69	0.71	0.76	37.3
11	T1	1142	7.2	1142	7.2	0.849	23.3	LOS B	34.4	255.5	0.73	0.74	0.80	24.6
Approach		1172	7.4	1172	7.4	0.849	23.4	LOS B	34.4	255.5	0.73	0.74	0.80	25.3
All Vehicles		2413	7.6	2413	7.6	0.849	18.3	LOS B	34.4	255.5	0.51	0.52	0.55	28.7

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

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P3	NorthEast Full Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
P4	NorthWest Full Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
All Pedestrians		105	69.3	LOS F			0.96	0.96

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 3509 [Stacey St / Rookwood Rd PM - Development]

Network: N102 [Development PM]

Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 55 seconds (Site User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
SouthEast: Stacey Street (SE)														
4	L2	134	2.4	134	2.4	0.469	19.5	LOS B	6.0	44.0	0.78	0.76	1.04	32.0
5	T1	882	7.2	882	7.2	0.469	13.8	LOS A	6.9	51.3	0.80	0.70	0.86	49.2
Approach		1016	6.5	1016	6.5	0.469	14.6	LOS B	6.9	51.3	0.79	0.71	0.88	47.8
NorthWest: Rookwood Road (NW)														
11	T1	1159	6.7	1159	6.7	0.355	0.1	LOS A	0.5	3.5	0.03	0.03	0.03	69.5
12	R2	828	5.8	828	5.8	0.639	22.7	LOS B	9.5	70.0	0.88	0.83	0.89	34.6
Approach		1987	6.4	1987	6.4	0.639	9.5	LOS A	9.5	70.0	0.39	0.36	0.39	48.9
SouthWest: Rookwood Road (SW)														
1	L2	416	7.6	416	7.6	0.325	19.6	LOS B	4.1	30.8	0.76	0.77	0.76	39.3
Approach		416	7.6	416	7.6	0.325	19.6	LOS B	4.1	30.8	0.76	0.77	0.76	39.3
All Vehicles		3419	6.6	3419	6.6	0.639	12.2	LOS A	9.5	70.0	0.55	0.51	0.58	46.7

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

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P2	SouthEast Full Crossing	53	21.9	LOS C	0.1	0.1	0.89	0.89
P1	SouthWest Full Crossing	53	21.9	LOS C	0.1	0.1	0.89	0.89
All Pedestrians		105	21.9	LOS C			0.89	0.89

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 4276 [Rookwood Rd / George St / Davis Ln PM - Development]

Network: N102 [Development PM]

Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 150 seconds (Network Site User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Rookwood Road (S)														
1	L2	167	3.1	167	3.1	0.342	15.2	LOS B	7.7	55.9	0.76	0.72	0.76	32.0
2	T1	380	7.8	380	7.8	0.342	12.5	LOS A	7.7	55.9	0.78	0.69	0.78	18.6
3	R2	9	0.0	9	0.0	0.342	16.3	LOS B	7.5	55.8	0.79	0.68	0.79	23.4
Approach		557	6.2	557	6.2	0.342	13.4	LOS A	7.7	55.9	0.78	0.70	0.78	25.8
East: Davis Lane (E)														
4	L2	184	1.1	184	1.1	0.833	44.0	LOS D	9.9	69.6	1.00	0.95	1.18	6.5
5	T1	42	0.0	42	0.0	0.833	40.6	LOS C	9.9	69.6	1.00	0.95	1.18	21.5
Approach		226	0.9	226	0.9	0.833	43.3	LOS D	9.9	69.6	1.00	0.95	1.18	10.9
North: Rookwood Road (N)														
7	L2	9	22.2	9	22.2	0.650	14.0	LOS A	12.7	92.4	0.70	0.63	0.70	28.6
8	T1	955	4.3	955	4.3	0.650	10.5	LOS A	12.7	92.4	0.70	0.63	0.70	26.7
Approach		964	4.5	964	4.5	0.650	10.5	LOS A	12.7	92.4	0.70	0.63	0.70	26.8
West: George Street (W)														
10	L2	77	1.4	77	1.4	0.216	31.6	LOS C	2.5	17.4	0.88	0.74	0.88	23.2
Approach		77	1.4	77	1.4	0.216	31.6	LOS C	2.5	17.4	0.88	0.74	0.88	23.2
All Vehicles		1824	4.4	1824	4.4	0.833	16.3	LOS B	12.7	92.4	0.77	0.69	0.79	23.2

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

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	53	31.8	LOS D	0.1	0.1	0.92	0.92
P2	East Full Crossing	53	31.8	LOS D	0.1	0.1	0.92	0.92
P3	North Full Crossing	53	31.8	LOS D	0.1	0.1	0.92	0.92
P4	West Full Crossing	53	31.8	LOS D	0.1	0.1	0.92	0.92
All Pedestrians		211	31.8	LOS D			0.92	0.92

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

Future Development.sip8

MOVEMENT SUMMARY

Site: 61 [Hume Hwy / Rookwood Rd / Chapel Rd PM - Development]

Network: N102 [Development PM]

Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 150 seconds (Network User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Chapel Road (S)														
1b	L3	247	6.4	247	6.4	0.850	71.6	LOS F	24.5	180.4	1.00	0.96	1.16	19.9
2	T1	274	4.2	274	4.2	0.850	61.2	LOS E	24.5	180.4	0.97	0.85	1.01	17.2
3a	R1	7	100.0	7	100.0	0.595	60.7	LOS E	14.1	104.8	0.96	0.80	0.96	17.7
Approach		528	6.6	528	6.6	0.850	66.1	LOS E	24.5	180.4	0.99	0.90	1.08	18.6
NorthEast: Hume Highway (NE)														
24a	L1	116	7.3	116	7.3	0.842	32.1	LOS C	28.9	214.8	0.85	0.79	0.87	27.7
25	T1	1377	7.4	1377	7.4	0.842	20.2	LOS B	28.9	214.8	0.72	0.66	0.74	27.5
26b	R3	68	9.2	68	9.2	0.309	37.7	LOS C	2.8	21.3	0.90	0.75	0.90	15.6
Approach		1561	7.5	1561	7.5	0.842	21.8	LOS B	28.9	214.8	0.74	0.67	0.76	27.0
North: Rookwood Road (N)														
7b	L3	141	2.2	141	2.2	0.515	33.9	LOS C	21.6	153.9	0.75	0.71	0.75	11.3
8	T1	631	2.0	631	2.0	0.515	29.2	LOS C	21.6	153.9	0.72	0.65	0.72	26.3
9a	R1	323	12.4	323	12.4	0.959	67.2	LOS E	22.1	170.9	0.96	1.06	1.32	13.7
Approach		1095	5.1	1095	5.1	0.959	41.0	LOS C	22.1	170.9	0.79	0.78	0.90	21.0
SouthWest: Hume Highway (SW)														
30a	L1	138	13.0	138	13.0	0.876	59.0	LOS E	37.3	277.8	0.98	0.95	1.08	11.5
31	T1	1434	5.4	1434	5.4	0.876	56.8	LOS E	38.2	279.7	0.98	0.95	1.08	11.5
32b	R3	188	5.6	188	5.6	0.795	45.6	LOS D	9.7	70.8	1.00	0.92	1.15	24.2
Approach		1760	6.0	1760	6.0	0.876	55.8	LOS D	38.2	279.7	0.99	0.95	1.09	13.3
All Vehicles		4944	6.3	4944	6.3	0.959	42.9	LOS D	38.2	279.7	0.86	0.82	0.94	19.4

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

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
P3	North Full Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
P8	SouthWest Full Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
All Pedestrians		158	69.3	LOS F			0.96	0.96

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 1124 [Hume Hwy / Beresford Ave PM - Development]

Network: N102 [Development PM]

Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 150 seconds (Network User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Hume Highway (E)														
5	T1	1575	6.8	1575	6.8	0.364	1.0	LOS A	3.9	28.6	0.06	0.05	0.06	36.3
Approach		1575	6.8	1575	6.8	0.364	1.0	LOS A	3.9	28.6	0.06	0.05	0.06	36.3
North: Beresford Avenue (N)														
7	L2	15	0.0	15	0.0	0.054	64.2	LOS E	0.5	3.3	0.89	0.67	0.89	5.9
Approach		15	0.0	15	0.0	0.054	64.2	LOS E	0.5	3.3	0.89	0.67	0.89	5.9
West: Hume Highway (W)														
10	L2	189	0.6	189	0.6	0.623	6.8	LOS A	7.6	55.4	0.21	0.33	0.21	35.3
11	T1	1326	6.6	1326	6.6	0.623	1.5	LOS A	7.6	55.4	0.10	0.12	0.10	37.1
Approach		1516	5.8	1516	5.8	0.623	2.2	LOS A	7.6	55.4	0.11	0.15	0.11	36.8
All Vehicles		3105	6.3	3105	6.3	0.623	1.9	LOS A	7.6	55.4	0.09	0.10	0.09	36.1

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

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P3	North Full Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
P4	West Full Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
All Pedestrians		105	69.3	LOS F			0.96	0.96

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 1124 [Hume Hwy / Beresford Ave PM - Development]

Network: N102 [Development PM]

Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 150 seconds (Network User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Hume Highway (E)														
5	T1	1575	6.8	1575	6.8	0.364	1.0	LOS A	2.4	17.5	0.06	0.05	0.06	36.3
Approach		1575	6.8	1575	6.8	0.364	1.0	LOS A	2.4	17.5	0.06	0.05	0.06	36.3
North: Beresford Avenue (N)														
7	L2	15	0.0	15	0.0	0.054	64.2	LOS E	0.3	2.0	0.89	0.67	0.89	5.9
Approach		15	0.0	15	0.0	0.054	64.2	LOS E	0.3	2.0	0.89	0.67	0.89	5.9
West: Hume Highway (W)														
10	L2	189	0.6	189	0.6	0.623	6.8	LOS A	4.7	34.0	0.21	0.33	0.21	35.3
11	T1	1326	6.6	1326	6.6	0.623	1.5	LOS A	4.7	34.0	0.10	0.12	0.10	37.1
Approach		1516	5.8	1516	5.8	0.623	2.2	LOS A	4.7	34.0	0.11	0.15	0.11	36.8
All Vehicles		3105	6.3	3105	6.3	0.623	1.9	LOS A	4.7	34.0	0.09	0.10	0.09	36.1

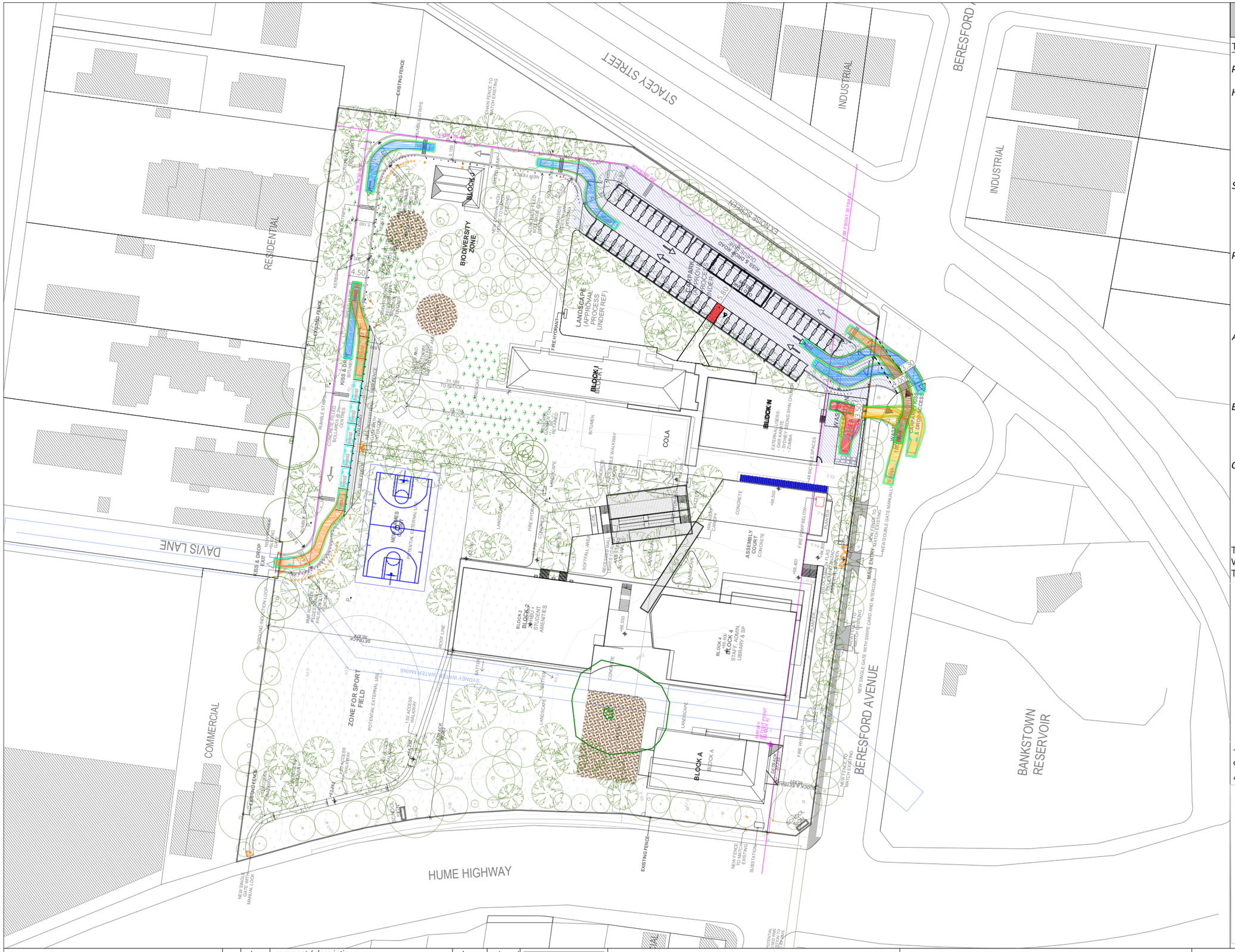
Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay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

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P3	North Full Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
P4	West Full Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
All Pedestrians		105	69.3	LOS F			0.96	0.96

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

Attachment 4 Design Review



comments

A3

TYPICAL

Please note the following compliance requirements:

Height Clearance: **2.2m** (min) throughout all areas of the car park accessible to vehicles and bicycles.
2.5m above accessible and shared bays
X wherever access is required for a refuse vehicle (and safety clearance envelope)

Sight Splays: Visibility splays in the form of a **2.5m x 2m** right-angled triangle to be provided (AS2890.1). Ensure design avoids visual obstructions in sight splay (i.e. dense landscaping, tall fencing/walls etc.)

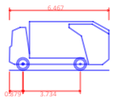
Parking Spaces: The parking envelopes shown, must be kept clear of all physical obstructions, including height clearance reductions. Ensure that grades within the parking module do not exceed 1:20 (1:40 for accessible bays).

Accessible Spaces: To be designed in accordance with AS2890.6. i.e, standard parking space with adjacent shared bay (2.4m x 5.4m), to be installed as per AS2890.6 requirements (bollard and markings).

Bicycle Parking: Bicycle spaces are to allow for a envelope of 500mm by 1800mm, with an aisle width of 2000mm for locker storage, or 1500mm for racks.

Control Measures: Please note recommended control measures, including line markings, signage, bollards, convex mirrors, lights etc.

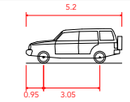
TURNING PATH ASSESSMENT DEMONSTRATING A WASTE COLLECTION VEHICLE ENTERING AND EXITING THE SITE



Hino 165 F + Wayne SPR6 Refuse Truck

Overall Length	6.467m
Overall Width	2.296m
Overall Body Height	3.170m
Min Body Ground Clearance	0.375m
Track Width	2.296m
Lock to lock time	6.00s
Kerb to Kerb Turning Radius	6.187m

TURNING PATH ASSESSMENT DEMONSTRATING A 99th PERCENTILE VEHICLE (FORD FAIRLANE) ENTERING AND EXITING THE SITE



B99 Vehicle (Realistic min radius) (2004)

Overall Length	5.200m
Overall Width	1.940m
Overall Body Height	1.878m
Min Body Ground Clearance	0.272m
Track Width	1.840m
Lock-to-lock time	4.00s
Curb to Curb Turning Radius	6.250m

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rev	date	comment / description	drawn	reviewed
5	13/07/20	For Information	PS	KB
4	22/04/20	For Review	PS	KB
3	17/04/20	For Information	PS	KB
2	16/04/20	For Information	PS	KB
1	19/03/20	For Information	PS	KB

project
Bankstown North Public School

drawing title
Main Works
Design Review

client	SINSW
drawing #	ptc-001
project #	KB - 2710
scale	1 : 1000

rev 5

RESIDENTIAL

BLOCK J

BIODIVERSITY ZONE

BLOCK I

LANDSCAPE (APPROVAL PROCESS UNDER REF)

CARPARK (APPROVAL PROCESS UNDER REF)

KISS & DROP QUEUE LANE

OSD TANK BELOW

EX NOISE SCREEN

9M SETBACK

5M SETBACK

SPEED HUMP

RUMBLE STRIPS

CONCRETE FILLED BOLLARDS @ 2m CENTRES

NEW FENCE

NEW 2100mm HIGH FENCE TO MATCH EXISTING

RMS ROADSIDE PEDESTRIAN + PALISADE 2.1M FENCING

EXISTING FENCE

KERBS

KISS & DROP ENTRY

KISS & DROP EXIT

BITUMEN

MULCH

TABLES AND SEATS SUPPLIED AND INSTALLED BY AMS

FIRE HYDRANT

31,100 TO BLOCK I

23,100 TO BLOCK I

WALKWAY

NEW PEDESTRIAN GATE WITH INTERCOM

EX MEMORIAL GARDEN TO BE RETAINED

COLA

EXTERNAL USERS:
- GKR KARATE
- SYDNEY SEONG SHIN

ACCESSIBLE WALKWAY

CONCRETE

CANOPY

LANDSCAPE

NEW POWER SLIDING GATE

NEW GAMES COURT

POTENTIAL EXTERNAL USE

DAVIS LA

SOFTFALL AREA

SLIDE

RECESSED WALL LIGHTS TO RAMP AND STAIRS

BLOCK WALLS

WALKWAY CANOPY

ASSEMBLY COURT

+63.700

+63.500

+64.500

+66.500

comments

A3

TYPICAL

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Height Clearance: **2.2m** (min) throughout all areas of the car park accessible to vehicles and bicycles.
2.5m above accessible and shared bays
X wherever access is required for a refuse vehicle (and safety clearance envelope)

Sight Splays: Visibility splays in the form of a **2.5m x 2m** right-angled triangle to be provided (AS2890.1). Ensure design avoids visual obstructions in sight splay (i.e. dense landscaping, tall fencing/walls etc.)

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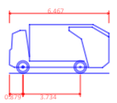
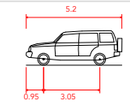
TURNING PATH ASSESSMENT DEMONSTRATING A WASTE COLLECTION VEHICLE ENTERING AND EXITING THE SITE



Hino 165 F + Wayne SPR6 Refuse Truck

Overall Length	6.467m
Overall Width	2.296m
Overall Body Height	3.170m
Min Body Ground Clearance	0.375m
Track Width	2.296m
Lock to lock time	6.00s
Kerb to Kerb Turning Radius	6.187m

TURNING PATH ASSESSMENT DEMONSTRATING A 99th PERCENTILE VEHICLE (FORD FAIRLANE) ENTERING AND EXITING THE SITE



B99 Vehicle (Realistic min radius) (2004)

Overall Length	5.200m
Overall Width	1.940m
Overall Body Height	1.878m
Min Body Ground Clearance	0.272m
Track Width	1.840m
Lock-to-lock time	4.00s
Curb to Curb Turning Radius	6.250m

ptc.

Suite 502, 1 James Place
North Sydney NSW 2060

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ptcconsultants.co

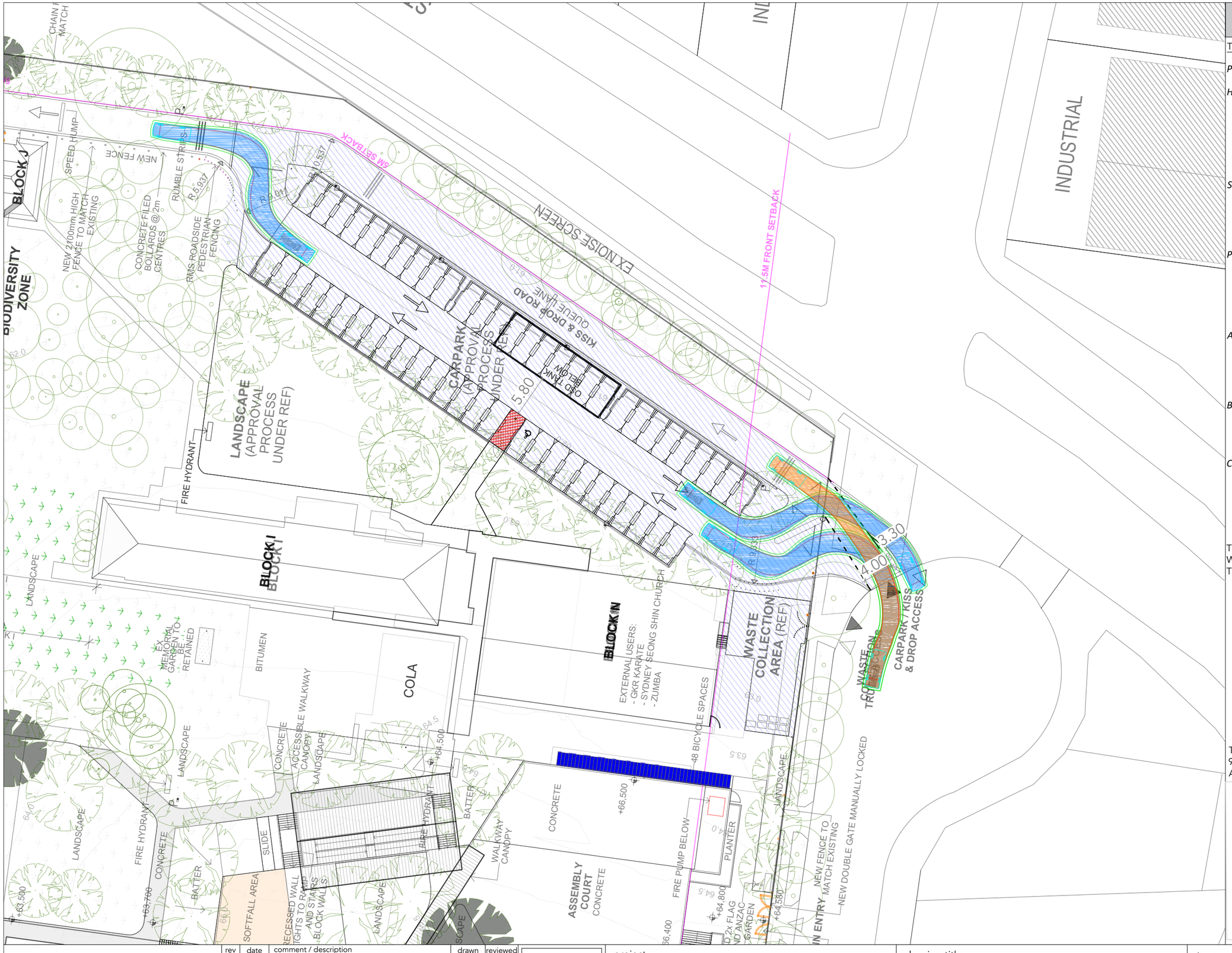
rev	date	comment / description	drawn	reviewed
5	13/07/20	For Information	PS	KB
4	22/04/20	For Review	PS	KB
3	17/04/20	For Information	PS	KB
2	16/04/20	For Information	PS	KB
1	19/03/20	For Information	PS	KB

project
Bankstown North Public School

drawing title
Main Works
Design Review - Kiss and Drop Area

client	SINSW
drawing #	ptc-002
project #	KB - 2710
scale	1 : 500

rev 5



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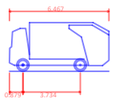

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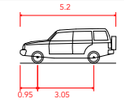

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1	19/03/20	For Information	PS	KB

project
Bankstown North Public School

drawing title
Main Works
Design Review - Car Park

client	SINSW
drawing #	ptc-003
project #	KB - 2710
scale	1 : 500

rev 5

comments

A3

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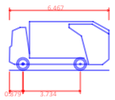

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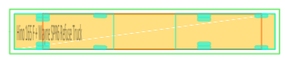

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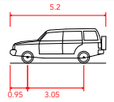

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project
Bankstown North Public School

drawing title
Main Works
Design Review - Waste Vehicle

client	SINSW
drawing #	ptc-004
project #	KB - 2710
scale	1 : 250

rev 5

Attachment 5 SINSW Vehicle Safety Program General Standard

SCHOOL INFRASTRUCTURE NSW

SINSW Vehicle Safety Program General standard

ISSUE DATE: 27 August 2019

Contents

1. Introduction

This document is issued to provide an outline of the proposed solution to each of the identified risks from the Vehicle-related Pedestrian Risk Management review.

2. Identified areas & Proposed Control Measure

The solutions proposed below have been prepared on the following preparation;

- To provide a generic response to the risk area to allow budget preparation for the SINSW.
- The actual solution at each site will need to be correctly scope and designed
- Pedestrian and vehicle movements are to be separated
- Vehicles protection measures are to be installed when vehicle access is within 5m of a building
- That when vehicles are on site, a maximum speed limit of 10km/hr are to apply

2.1 Vehicle Access and Egress to school site

Install sliding control gate with card access and remote override

- Install speed limit signs
- Install vehicle rumble strips
- Recommend that vehicle movements be minimised 30mins prior to the school start time, and 30mins after school finish time

2.2 Vehicle access generally

Speed limit of 10km/hr be introduced on all roads and vehicle access on school sites.

2.3 Roadways with Buildings within 5m

Where roadway is within 2m of the building install;

- At bends and 2m before and after change of direction, RMS Roadside Pedestrian Fencing
- On straights 90mm concrete filled steel bollards at 2m centres

2.4 Parking Areas with Buildings within 2m

Due the proximity of the vehicle to the buildings it is proposed to undertake the following;

- Wheel stop to be installed in each vehicle bay
- 150mm concrete filled steel bollards in the centre of each parking space

2.5 Parking Areas with Buildings within 5m

Due the proximity of the vehicle to the buildings it is proposed to undertake the following;

- Wheel stop to be installed in each vehicle bay
- Telegraph pole installed on concrete cradles

2.6 Pedestrian and vehicle shared access to the school via a roadway

- Separation of vehicle and pedestrian access ways
- RMS Roadside Pedestrian Fencing to provide separation between pedestrian and vehicle routes

2.7 Student Drop off on the School Sites

For drop off zones within school premises;

- Introduce 10km/hr speed limits
- Introduce rumble strips and traffic calming measures
- At bends and 2m before and after change of direction, RMS Roadside Pedestrian Fencing
- On straights 90mm concrete filled steel bollards at 2m centres

2.8 Parking outside of formally designated Parking areas within the school site

It is proposed to implement the following;

- The use of all non-designated parking areas to be discontinued or formalised
- If areas are discontinued, vehicle barriers and bollards to be installed to prevent reuse
- For formalised areas, signage, traffic calming measures, and barriers to be installed
- In the event of temporary parking on site traffic control and temporary barriers to be utilised

2.9 Waiting areas for Bus pick up

For drop off zones within school premises;

- Introduce 10km/hr speed limits
- Waiting area be separated from bus zone by RMS Roadside Pedestrian Fencing with limited openings

3. Proposed System Solution Images

3.1 RMS Roadside Pedestrian Fencing

3.2 Bollards

150mm bollard

90mm Bollard

3.3 Wheels stops

3.4 Gate

3.5 Speed signage

3.6 Rumble strip

Thoughtful Transport Solutions

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sctconsulting.com.au