M^CLAREN TRAFFIC ENGINEERING

Address: Shop 7, 720 Old Princes Highway Sutherland NSW 2232
Postal: P.O Box 66 Sutherland NSW 1499

Telephone: (02) 9521 7199
Fax: +61 2 9521 7199
Web: www.mclarentraffic.com.au
Email: admin@mclarentraffic.com.au

Division of RAMTRANS Australia ABN: 45067491678 RPEQ: 19457

Transport Planning, Traffic Impact Assessments, Road Safety Audits, Expert Witness

18 January 2023 Reference: 220509.02FA

Precinct Capital Pty Ltd
Level 1, 2 Barrack Street
Sydney NSW 2000
Attention: Dylan Baudinet

SUPPLEMENTARY TRAFFIC AND PARKING ADVICE FOR THE APPROVED BUSINESS PARK AT OLD CASTLEREAGH ROAD AND LUGARD STREET, PENRITH

Dear Dylan,

Reference is made to your request to provide supplementary traffic and parking advice for the Approved Business Park at Old Castlereagh Road and Lugard Street, Penrith, with approved plans depicted in **Annexure A** for reference. This letter addresses consent condition C23 of the Determination of Development Application by Grant of Consent for DA 9876. The condition is reproduced below:

> ***Road Works***
>
> *C23. Prior to the commencement of construction for each stage referred to in (a)-(c) below, the Applicant must submit plans and technical specifications for that stage, to the satisfaction of the relevant roads authority, for the following works:*
>
> *(b) Left turn deceleration lane from Castlereagh Road to Lugard Street at Stage 9; and*

M^CLaren Traffic Engineering (MTE) has been commissioned to undertake a review of whether the left-turn deceleration lane required by Condition C23. (b) is needed, noting that no traffic modelling of this option was produced as part of the development application or subsequent land and environment court proceedings.

The relevant extracts from the judgement handed down by Commissioner Gray are quoted below.

> *Traffic and pedestrian safety*
>
> *56. The Minister raised a contention concerning pedestrian safety and the impact of the proposed development on the local traffic network (Part 2 Contention 1).*
>
> *57. The entry into a voluntary planning agreement, and the certification of the Secretary dated 25 February 2022, means that the potential impacts on the surrounding state road network have been accommodated by the provision of a contribution for state and regional roads and do not need to be further considered.*

58. The remaining issues concerning the local traffic network relate to the intersections of Castlereagh Road and Lugard Street, and Old Castlereagh Road and Road 3 of the proposed development. Both Great River and the Minister agree that this resolved by agreed conditions for certain road works to be carried out at those two intersections.

59. Similarly, the Minister agrees that the issue concerning pedestrian safety is resolved by agreed conditions requiring pedestrian and cycle path improvements along Lugard Street.

60. I accept that each of the issues concerning pedestrian safety and the impact of the proposed development on the traffic network have now been resolved.

From the above, it is evident that the approval was granted on the basis that the entry into the voluntary planning agreement resolves any potential impacts on the surrounding State road network and that the remaining issues discussed in paragraph 58 of the judgement are related to the performance of local roads.

As such, to examine whether the works required by Condition C23. (b) are required, an assessment of the intersection of Lugard Street and Castlereagh Street has been undertaken in SIDRA Intersection 9.0. The details of this assessment are provided below.

1 Traffic Assessment

1.1 Traffic Generation

To examine the warrant for a deceleration lane, a SIDRA INTERSECTION 9.0 assessment of the traffic volumes provided within the *Penrith Lakes Traffic and Transport Investigation – Traffic Modelling Report* written by GHD (GHD Report) dated 25 May 2022 has been undertaken. Reference is made to the *GHD Report – Table 10* (extract provided in **Annexure B**) which provides the following traffic generation assumptions relevant to the proposed development:

- *GFA is 55% of total land area, based on an economic report by the developer of the employment land detailing the likely development of the site*
- *80% of Area is industrial uses and 20% of Area is offices*
- *GFA were provided by DPIE: 75,000m^2 for Industrial and 180,000m^2 for office*
- *Business parks and industrial estates' peak hour trip generation rates for AM (0.52) and PM (0.56) from Page 2 in RMS TDT2013/04a*
- *Office blocks' peak hour trip generation rates for AM (1.6) and PM (1.2) from Page 2 in RMS TDT2013/04a*
- *Assumed no weekend trips due to land use type*
- *Important: previously DPIE advised a 70% and 30% split of Industrial and office. In the current revision supplied to GHD it was updated to 80% and 20%, hence updated total trips.*

The traffic generation, according to the GHD report considering the assumptions above is summarised in **Table 1**. It is noted that neither MTE nor the applicant agree with the assumptions or findings of the GHD report in relation to the scale or traffic generating potential of the subject site and that this assessment has been undertaken with the intent to provide a sensitivity analysis only.

TABLE 1: GHD REPORT TABLE 10 – TRAFFIC GENERATION

Land Use	Peak Period	Traffic Generation Split		
		In	Out	Total
Industrial	AM	1080	120	1200
	PM	90	810	900
	Weekend	0	0	0
Office	AM	749	187	936
	PM	202	807	1008
	Weekend	0	0	0

It should be noted that the assumptions made within the GHD Report with considerations to point 2, point 3 and point 7 are contradictory. Points 2 and 7 state that 80% of area is industrial and 20% of area is office, however, point 3 details that 75,000m^2 is industrial and 180,000m^2 is office. Additionally, when calculating GFA from the traffic generation in **Table 1**, the following GFA's are resulted, as summarised in **Table 2**.

TABLE 2: GFA CALCULATIONS FROM GHD REPORT TRIP GENERATION

Land Use	Peak Period	Total Traffic Generation	Traffic Generation Rate	Resulting GFA
Industrial	AM	1200 trips	0.52 per 100m^2	230,769m^2
	PM	900 trips	0.56 per 100m^2	160,714m^2
Office	AM	936 trips	1.6 per 100m^2	58,500m^2
	PM	1008 trips	1.2 per 100m^2	84,000m^2

As shown above, the resulting GFA's are inconsistent when compared to the AM and PM peak periods and as such the figures provided by GHD in Table 10 of their report appear unreliable. To provide for a reasonable assessment, the following assumptions were adopted in line with the GHD Report:

- 255,000m^2 gross floor area (GFA) (as per point 3 of the GHD assumptions above);
- 80% Industrial use (204,000m^2 GFA) and 20% Office use (51,000m^2 GFA) (as per point 2 of the GHD assumptions above);
- Industrial estate traffic generation rates as per the RMS TDT2014/03a (as per point 4 of the GHD assumptions above);
- Office block traffic generation rates as per the RMS TDT2014/03a (as per point 5 of the GHD assumptions above).

The resulting traffic generation is summarised in **Table 3**.

TABLE 3: CORRECTED GHD TRAFFIC GENERATION

Land Use	Scale	Peak Period	Traffic Generation Rate	Traffic Generation	
				IN	OUT
Industrial	204,000m^2	AM	0.52 per 100m^2 GFA	955	106
		PM	0.56 per 100m^2 GFA	114	1029
Office	51,000m^2	AM	1.6 per 100m^2 GFA	653	163
		PM	1.2 per 100m^2 GFA	122	490
Total	**-**	**AM**	**-**	**1608**	**269**
		PM		**236**	**1519**

Note:

(1) 90% inbound and 10% outbound assumed for the AM peak period, vice versa for the PM peak period. Same as the GHD Report distribution for Industrial;

(2) 80% inbound and 20% outbound assumed for the AM peak period, vice versa for the PM peak period. Same as the GHD Report distribution for Office.

As shown above, in accordance with the GHD Report assumptions, the proposed development is estimated to generate **1877** trips in the AM peak period (1608 in, 269 out) and **1755** trips in the PM peak period (236 in, 1519 out). A 85% / 15% split of light and heavy vehicles has been used, consistent with the most recent Business Park data provided by TfNSW.

1.2 Traffic Distribution

Based on an appraisal of the surrounding road network and the approved access points for the site, the distribution of traffic has been assumed to be as summarised in **Table 4**.

TABLE 4: TRAFFIC DISTRIBUTION

Peak Time	Direction	North Approach Castlereagh Rd		South Approach Castlereagh Rd		West Approach Lugard St	
		Right Turn	Through	Through	Left Turn	Right Turn	Left Turn
AM	**IN**	15%		5%	25%		
	OUT		5%			15%	25%
PM	**IN**	15%		5%	25%		
	OUT		5%			15%	25%

1.3 Traffic Impact

Two traffic volume scenarios were considered in SIDRA INTERSECTION 9.0 which included:

- Future 2036 + Development (Full Yield) – No Left Turn Lane
- Future 2036 + Development (Full Yield) – With Left Turn Lane

The results of this assessment are shown in **Table 5** (with the complete SIDRA results reproduced in **Annexure C**). The performance of the local road (Lugard Street) approach is examined more closely in **Table 6**.

TABLE 5: INTERSECTION PERFORMANCE (SIDRA INTERSECTION 9.0) – GHD REPORT

Intersection	Peak Hour	Degree of Saturation[1]	Average Delay[2] (sec/veh)	Level of Service[3][4]	Control Type	Worst Movement	95th Percentile Queue
FUTURE PERFORMANCE 2026 + DEVELOPMENT – No Left Turn Lane							
Castlereagh Road /Lugard Street	AM	0.81	21.7	**B**	Signals	RT from Lugard Street	30.9 veh (230.7m) Castlereagh Road
	PM	0.75	25.1	**B**		RT from Castlereagh Road	25.2 veh (192.1m) Castlereagh Road
FUTURE PERFORMANCE 2036 + DEVELOPMENT – With Left Turn Lane							
Castlereagh Road /Lugard Street	AM	0.63	18	**B**	Signals	RT from Lugard Street	17.2 veh (135m) Castlereagh Road
	PM	0.72	21.9	**B**		RT from Lugard Street	24 veh (182.7m) Castlereagh Road

TABLE 6: LUGARD STREET APPROACH PERFORMANCE – SIDRA 9

Movement	Peak Hour	Degree of Saturation	Average Delay	Level of Service
FUTURE PERFORMANCE 2026 + DEVELOPMENT – No Left Turn Lane				
Left Turn	AM	0.167	24.6	B
	PM	0.745	34.0	C
Right Turn	AM	0.453	49.0	D
	PM	0.447	29.2	C
Approach	AM	0.453	36.8	C
	PM	0.745	32.2	C
FUTURE PERFORMANCE 2036 + DEVELOPMENT – With Left Turn Lane				
Left Turn	AM	0.144	20.2	B
	PM	0.709	31.5	C
Right Turn	AM	0.453	49.0	D
	PM	0.639	40.1	C
Approach	AM	0.453	34.6	C
	PM	0.709	34.7	C

As shown above, the intersection of Castlereagh Road / Lugard Street performs at a LoS “B” under future conditions whether or not a left turn deceleration lane is constructed for the left turn into Lugard Street from Castlereagh Road. Examining more closely the performance of the local road, there is no noticeable difference in performance between the two layouts.

Based on the results presented above, there is no nexus between the approved development and the construction of a left-turn deceleration lane on Castlereagh Road on the approach to Lugard Street. The construction of this lane is, therefore, not required and the relevant condition should be removed.

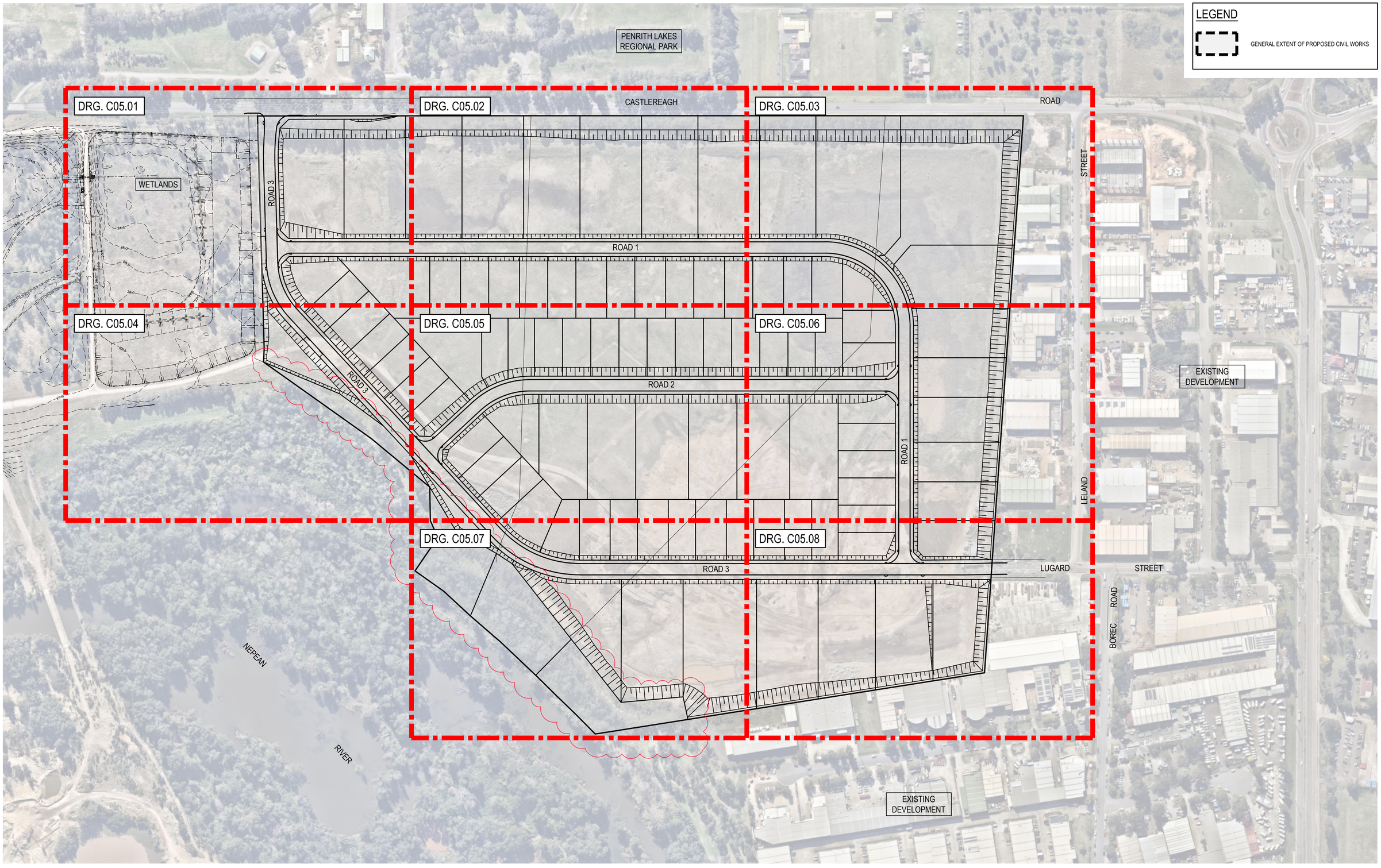
Please contact the undersigned on 9521 7199 should you require further information or assistance.

Yours faithfully,
McLaren Traffic Engineering

Tom Steal
Senior Traffic Engineer
B.E (Civil) MIEAust
Accredited Level 2 Road Safety Auditor

ANNEXURE A: PROPOSED PLANS

(1 SHEET)



REV.	DATE	DESCRIPTION	DRN.	DES.	VERIF.	APPD.
5	4/11/2021	RE-ISSUED FOR INFORMATION	MDH	ML	MKH	MKH
4	17/12/2020	ISSUED FOR DEVELOPMENT APPLICATION	MDH	ML	MKH	MKH
3	11/12/2020	ISSUED FOR CLIENT REVIEW	MDH	ML	MKH	MKH
2	2/10/2020	ISSUED FOR INFORMATION	MDH	ML	MKH	MKH
1	28/10/2020	ISSUED FOR INFORMATION	MDH	ML	MKH	

Client: NEPEAN BUSINESS PARK

Scale: 0 50 100 150 200m — SCALE 1:2000 @A1

North

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enspire
Enspire Solutions Pty Ltd
205/275 Alfred Street N, North Sydney NSW 2060
ABN: 71 624 801 690
Phone: 02 9922 6135

Project: NEPEAN BUSINESS PARK
PENRITH

Title: GENERAL ARRANGEMENT PLAN

Scale: 1:2000
Date: 28/10/2020
Size: A1
Datum: AHD

Status: FOR INFORMATION ONLY
NOT TO BE USED FOR CONSTRUCTION

Project Number/Drawing Number: 200044-DA-C01.41
Revision: 5

CAD File: P:\200044 NepeanBusinessPark\D-Civil\01-Subdivision\Drawings\6-DACC\3-DA COURT DRAWINGS\200044-DA-C01.41 GENERAL ARRANGEMENT PLAN.dwg

DATE PLOTTED: 5 November 2021 11:10 AM BY : MARK HENNESSEY

ANNEXURE B: EXTRACT FROM GHD REPORT

(1 SHEET)

Precinct ID	Indicative Land Use	AM Peak Hour Period Trip Generatio			PM Peak Hour Period Trip Gen			Weekend Peak Hour Period Trip Generation (veh/hr)			Zoning / use status	Assumptions and source
		In	Out	Total	In	Out	Total	In	Out	Total		
1	Heritage	8	2	**10**	2	8	**10**	25	25	**50**	**Unzoned land**. Long-term land use zoning not yet decided.	• The proposed future heritage land use for this precinct is yet to be determined at this stage. • In the absence of detailed base information, trip generation and vehicle numbers have been assumed based on 10 trips per weekday peak hour and 50 trips per weekend peak hour. • GFA was not used in the calculation of trip generation for this precinct, so has been excluded from this table.
2	Recreational / Educational	7	7	**14**	5	5	**10**	0	0	**0**	**Unzoned land**. Long-term land use zoning not yet decided.	• 20% of pupils are arrive by private cars and 80% of pupils travel via shuttle bus for excursion, where previously it was assumed that all pupils arrive by private cars. This is based on known coach trips during the weekday, using numbers provided by DoE. • 120 pupils • Peak hour trip generation rates for AM (0.62) and PM (0.43) from Table 6.2 in *Trip Generation Surveys, Schools Analysis Report* (Roads and Maritime Services, 2014) • Assumed Environmental Education Centre does not open on weekends, same as existing urban EEC opening hours • GFA was not used in the calculation of trip generation for this precinct, so has been excluded from this table.
3	Camping	0	0	**0**	0	0	**0**	182	45	**227**	**Unzoned land**. Long-term land use zoning not yet decided.	• 600 camp site units based on GFA • Approximately 0.38 trips per camp site, based on *ITA Trip Generation, 10th Edition*, assuming weekend trip generation rate 40% higher than PM peak • Assumed camp groups / recreational vehicle park is open on weekends only • Assumed weekend campers generally have full day access to the site and may travel outside of weekend peak hour period • GFA was not used in the calculation of trip generation for this precinct, so has been excluded from this table.
4	Lifestyle - total	254	64	**318**	73	216	**289**	235	218	**453**	**Unzoned land**. Long-term land use zoning not yet decided.	• GFA is 3% of land area • 60% of GFA is for private recreation (i.e. Health/Fitness club) and 40% of GFA is for business development (i.e. Major hardware and building supplies stores). • Health/fitness club peak hour trip generation based on *ITA Trip Generation, 10th Edition* • Major hardware and building supplies stores' peak hour trip generation rates for weekdays (4.2 veh/hr per 100m2 GFA) and weekends (5.6 veh/hr per 100m2 GFA) from Page 3 in RMS TDT2013/04a • Health / Fitness Club assumed no AM peak hour trips, with all staff trips assumed occur outside AM peak hour. • Health / Fitness club has weekend peak hour trips as 30% of PM peak hour trips • The trip generation for both was adjusted to account for 8% public transport use, based on GHD Penrith Lakes Stage 1 Report, which predicted little public transport use (less than 10%) and journey to work data (8%)
	Health / fitness club	0	0	**0**	23	18	**41**	70	53	**123**		
	Major hardware and building supplies store	254	64	**318**	50	199	**249**	166	166	**332**		
5	Business / Special Uses	109	27	**136**	29	117	**146**	0	0	**0**	**Unzoned land**. Long-term land use zoning not yet decided.	• GFA is 5% of land area • The trip generation rates are based on a business park in TDT2013/04a - AM: 0.52 trips /100m^2; and PM: 0.56 trips /100m^2 • Assumed no weekend trips due to land use type
6	Recreational	37	9	**46**	47	12	**59**	71	18	**88**	**Unzoned land**. Long-term land use zoning not yet decided.	• GFA is 0.25% of land area • Peak hour trip generation rates for PM (2.4 trips / 100m^2) were adopted from *ITA Trip Generation, 10th* • Lower AM rate (2 trips / 100m^2) and higher weekend rate (3.6 trips / 100m^2) were assumed
7	Lifestyle	254	64	**318**	73	216	**289**	235	218	**454**	**Unzoned land**. Long-term land use zoning not yet decided.	• See Precinct 4 • Split of trips between Health / fitness club and Major hardware and building supplies store assumed to be identical to those in Precinct 4
8	Business / Special Uses	147	37	**184**	40	159	**199**	0	0	**0**	**Unzoned land**. Long-term land use zoning not yet decided.	• GFA is 5% of land area • Business parks and industrial estates' peak hour trip generation rates for AM (0.52) and PM (0.56) from Page 2 in RMS TDT2013/04a • Assumed no weekend trips due to land use type
9	Tourism West	352	61	**413**	87	247	**334**	47	34	**81**	**Zoned land**. Likely use known.	• A film studio has been assumed as the land use for the Tourism West precinct, based on information received from developers. • Land uses and GFA values are based on information from the possible developer of this land, approximately 55% of land area.
	Film studio	179	45	**224**	45	179	**224**	30	30	**60**		• This land use comprises sound stages / production sheds, set and costume manufacturing spaces, and ancillary food / drink and car parking uses. • Assumed staff accessing the film studio are predominantly driving. • Assumed up to 1121 vehicles on-site per weekday and with 83% occupancy / use of the 1350 parking spaces. • In absence of trip generation guidance around film studio land use, it is assumed to have 20% of the daily trips in AM and PM peak hours each. • An estimated 300 daily trips for the weekend based on information received from the developer, with 20% of trips during peak hours.
	Visitor accommodation	34	9	**43**	34	9	**43**	17	4	**21**		• This land uses comprises short and long-term accommodation for both those using the film studio facilities and visitors. • Trip generation based on 125 motel units with 85% occupancy rates • 0.4 trips per motel during peak, 85% occupancy rates as per Page 3-3 in *Guide to Traffic Generating Developments* (Roads and Maritime Services, 2002) • Weekend traffic is 50% of PM peak hour traffic
	Film academy / school	110	0	**110**	0	28	**28**	0	0	**0**		• This land comprises a film academy, including studio spaces, lecture rooms, workshops etc. • Assumed up to 100 students and 10 staff at this tertiary institution • Assumed around 25% of students and staff would leave the school during the PM peak hour. Typical school peak hour for tertiary education is outside of 3pm to 5pm window. • Assumed no weekend trips due to land use type • In absence of trip generation guidance around tertiary film academy land use, it is assumed to have 100 trips in the AM peak hour associated with students travelling in their own vehicles (rather than drop-off/pick-up). It is also assumed 10 AM peak trips for staff movements. Hence total 110 trips in weekday AM peak.
	Office spaces / reception	29	7	**36**	8	31	**39**	0	0	**0**		• This land use comprises office spaces and reception for the film studio. • The trip generation rates are based on a business park in TDT2013/04a - AM: 0.52 trips /100m^2; and PM: 0.56 trips /100m^2 • Assumed no weekend trips due to land use type
10	Tourism & Visitor Acco-mmodation	32	8	**40**	64	16	**80**	90	22	**112**	**Unzoned land**. Long-term land use zoning not yet decided.	• 200 motel units • 0.4 trips per motel during PM peak as per Page 3-3 in *Guide to Traffic Generating Developments* (Roads and Maritime Services, 2002), 100% occupancy rates • Weekend traffic is 140% of PM peak hour traffic • AM peak hour trips are 50% of PM peak hour traffic • GFA was not used in the calculation of trip generation for this precinct, so has been excluded from this table.
11	Golf Course	40	40	**80**	49	49	**98**	72	72	**144**	**Unzoned land**. Long-term land use zoning not yet decided.	• ITE Code “Golf Course 430” in *ITE Trip Generation Rates* (8th Edition) • 36 golf holes • Municipal and private country club • Lower trip rate in AM (80%) and higher trip rates in weekend (150%) • GFA was not used in the calculation of trip generation for this precinct, so has been excluded from this table.
12	Rowing / recreation excl. Tourism South	0	0	**0**	0	0	**0**	72	18	**90**	**Zoned land**. In use for rowing / recreation.	• GFA is 0.25% of total land area • Rather than survey an existing development, camp sites have been used as a reference for this precinct. Given rowing / recreation is an existing land use, future projections only consider the intensification of this use • 448 camp site units • Trip generation rate based on *ITA Trip Generation, 10th Edition* assuming camp groups / recreational vehicle park is open on weekends only and weekend campers having full day access to the site
9A	Tourism South	27	7	**34**	27	7	**34**	14	3	**17**	**Zoned land**. Not yet in use.	• 300 motel units • Assumed weekend peak hour trips is 50% of PM peak hour trips • 0.4 trips per motel during PM peak, 85% occupancy rates as per Page 3-3 in *Guide to Traffic Generating Developments* (Roads and Maritime Services, 2002) • GFA was not used in the calculation of trip generation for this precinct, so has been excluded from this table.
13	Employment - total	1,829	307	2,136	292	1,617	1,909	0	0	**0**	**Zoned land**. Likely use known.	• GFA is 55% of total land area, based on an economic report by the developer of the employment land detailing the likely development of the site • 80% of Area is industrial uses and 20% of Area is offices • GFA were provided by DPIE: 75,000m2 for Industrial and 180,000m2 for office • Business parks and industrial estates' peak hour trip generation rates for AM (0.52) and PM (0.56) from Page 2 in RMS TDT2013/04a • Office blocks' peak hour trip generation rates for AM (1.6) and PM (1.2) from Page 2 in RMS TDT2013/04a • Assumed no weekend trips due to land use type • important: previously DPIE advised a 70% and 30% split of Industrial and office. In the current revision supplied to GHD it was updated to 80% and 20%, hence updated total trips.
	Industrial	1,080	120	1,200	90	810	900	0	0	**0**		
	Office	749	187	936	202	807	1,008	0	0	**0**		
	Total	**3098**	**632**	**3730**	**787**	**2669**	**3456**	**1042**	**674**	**1717**		

ANNEXURE C: SIDRA RESULTS

(12 SHEETS)

MOVEMENT SUMMARY

Site: 101 [AM EX - Lugard / Castlereagh (Site Folder: Existing)]

New Site
Site Category: Existing Design
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 100 seconds (Site User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Castlereagh Road (S)														
1	L2	53	1.9	58	2.2	0.354	15.4	LOS B	9.0	70.7	0.52	0.50	0.52	49.7
2	T1	634	13.9	709	15.6	* 0.354	10.1	LOS A	9.1	72.6	0.53	0.48	0.53	51.2
Approach		687	13.0	768	14.6	0.354	10.5	LOS A	9.1	72.6	0.53	0.49	0.53	51.0
North: Castlereagh Road (N)														
8	T1	845	12.0	943	13.5	0.360	5.2	LOS A	8.3	64.7	0.39	0.35	0.39	55.2
9	R2	49	0.0	54	0.0	* 0.118	11.4	LOS A	0.8	5.5	0.47	0.67	0.47	49.4
Approach		894	11.3	997	12.7	0.360	5.6	LOS A	8.3	64.7	0.40	0.37	0.40	54.9
West: Lugard Street (W)														
10	L2	13	15.4	15	17.3	0.033	34.5	LOS C	0.5	4.2	0.76	0.68	0.76	37.3
12	R2	46	4.3	51	5.0	* 0.189	46.5	LOS D	2.2	16.2	0.91	0.74	0.91	33.3
Approach		59	6.8	65	7.7	0.189	43.9	LOS D	2.2	16.2	0.88	0.73	0.88	34.1
All Vehicles		1640	11.8	1830	13.3	0.360	9.0	LOS A	9.1	72.6	0.47	0.43	0.47	52.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site 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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Input Vol. ped/h	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
North: Castlereagh Road (N)												
P3	Full	50	53	44.3	LOS E	0.1	0.1	0.94	0.94	213.9	220.5	1.03
West: Lugard Street (W)												
P4	Full	50	53	44.3	LOS E	0.1	0.1	0.94	0.94	207.3	211.9	1.02
All Pedestrians		100	105	44.3	LOS E	0.1	0.1	0.94	0.94	210.6	216.2	1.03

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: 101 [PM EX - Lugard / Castlereagh (Site Folder: Existing)]

New Site
Site Category: Existing Design
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 100 seconds (Site User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Castlereagh Road (S)														
1	L2	25	5	27	22.5	0.486	16.8	LOS B	14.2	108.3	0.59	0.54	0.59	48.7
2	T1	1001	87	1057	10.0	* 0.486	11.3	LOS A	14.5	110.4	0.59	0.54	0.59	50.5
Approach		1026	92	1084	10.3	0.486	11.4	LOS A	14.5	110.4	0.59	0.54	0.59	50.5
North: Castlereagh Road (N)														
8	T1	817	54	860	7.6	0.317	5.0	LOS A	7.2	53.9	0.38	0.33	0.38	55.4
9	R2	23	2	24	10.0	* 0.079	12.8	LOS A	0.3	2.6	0.53	0.66	0.53	48.2
Approach		840	56	884	7.7	0.317	5.2	LOS A	7.2	53.9	0.38	0.34	0.38	55.2
West: Lugard Street (W)														
10	L2	47	1	49	2.5	0.100	35.0	LOS C	1.8	12.8	0.78	0.72	0.78	37.4
12	R2	75	3	79	4.6	* 0.291	47.4	LOS D	3.5	25.5	0.93	0.76	0.93	33.0
Approach		122	4	128	3.8	0.291	42.6	LOS D	3.5	25.5	0.87	0.75	0.87	34.6
All Vehicles		1988	152	2096	8.8	0.486	10.7	LOS A	14.5	110.4	0.52	0.47	0.52	50.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site 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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Input Vol. ped/h	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
North: Castlereagh Road (N)												
P3	Full	50	53	44.3	LOS E	0.1	0.1	0.94	0.94	213.9	220.5	1.03
West: Lugard Street (W)												
P4	Full	50	53	44.3	LOS E	0.1	0.1	0.94	0.94	207.3	211.9	1.02
All Pedestrians		100	105	44.3	LOS E	0.1	0.1	0.94	0.94	210.6	216.2	1.03

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: 101 [AM EX - Lugard / Castlereagh - 2026 Background Only (Site Folder: Future - 2026)]

New Site
Site Category: Existing Design
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 100 seconds (Site User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.
Design Life Analysis: Constant Number of Years = 1

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Castlereagh Road (S)														
1	L2	53	1.9	60	2.2	0.366	15.5	LOS B	9.5	73.9	0.53	0.51	0.53	49.6
2	T1	634	13.9	734	15.6	* 0.366	10.2	LOS A	9.6	75.9	0.53	0.49	0.53	51.1
Approach		687	13.0	795	14.6	0.366	10.6	LOS A	9.6	75.9	0.53	0.49	0.53	51.0
North: Castlereagh Road (N)														
8	T1	845	12.0	976	13.5	0.373	5.3	LOS A	8.7	67.8	0.40	0.36	0.40	55.2
9	R2	49	0.0	56	0.0	* 0.126	11.6	LOS A	0.8	5.7	0.48	0.67	0.48	49.2
Approach		894	11.3	1032	12.7	0.373	5.6	LOS A	8.7	67.8	0.40	0.37	0.40	54.8
West: Lugard Street (W)														
10	L2	13	15.4	15	17.3	0.034	34.5	LOS C	0.5	4.3	0.76	0.68	0.76	37.3
12	R2	46	4.3	53	5.0	* 0.195	46.6	LOS D	2.3	16.8	0.91	0.74	0.91	33.3
Approach		59	6.8	68	7.7	0.195	43.9	LOS D	2.3	16.8	0.88	0.73	0.88	34.1
All Vehicles		1640	11.8	1894	13.3	0.373	9.1	LOS A	9.6	75.9	0.48	0.44	0.48	52.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site 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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Input Vol. ped/h	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
North: Castlereagh Road (N)												
P3	Full	50	54	44.3	LOS E	0.1	0.1	0.94	0.94	213.9	220.5	1.03
West: Lugard Street (W)												
P4	Full	50	54	44.3	LOS E	0.1	0.1	0.94	0.94	207.3	211.9	1.02
All Pedestrians		100	107	44.3	LOS E	0.1	0.1	0.94	0.94	210.6	216.2	1.03

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: 101 [PM EX - Lugard / Castlereagh - 2026 Background Only (Site Folder: Future - 2026)]

New Site
Site Category: Existing Design
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 100 seconds (Site User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.
Design Life Analysis: Constant Number of Years = 1

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Castlereagh Road (S)														
1	L2	25	5	28	22.5	0.504	17.0	LOS B	14.9	113.8	0.60	0.55	0.60	48.5
2	T1	1001	87	1094	10.0	* 0.504	11.4	LOS A	15.3	116.0	0.60	0.55	0.60	50.4
Approach		1026	92	1122	10.3	0.504	11.6	LOS A	15.3	116.0	0.60	0.55	0.60	50.4
North: Castlereagh Road (N)														
8	T1	817	54	890	7.6	0.328	5.1	LOS A	7.6	56.4	0.38	0.34	0.38	55.4
9	R2	23	2	25	10.0	* 0.085	13.1	LOS A	0.4	2.7	0.54	0.67	0.54	48.0
Approach		840	56	915	7.7	0.328	5.3	LOS A	7.6	56.4	0.39	0.35	0.39	55.2
West: Lugard Street (W)														
10	L2	47	1	51	2.5	0.103	35.1	LOS C	1.9	13.3	0.78	0.72	0.78	37.4
12	R2	75	3	81	4.6	* 0.302	47.5	LOS D	3.6	26.5	0.93	0.77	0.93	33.0
Approach		122	4	132	3.8	0.302	42.7	LOS D	3.6	26.5	0.87	0.75	0.87	34.6
All Vehicles		1988	152	2169	8.8	0.504	10.8	LOS A	15.3	116.0	0.53	0.47	0.53	50.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site 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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Input Vol. ped/h	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
North: Castlereagh Road (N)												
P3	Full	50	54	44.3	LOS E	0.1	0.1	0.94	0.94	213.9	220.5	1.03
West: Lugard Street (W)												
P4	Full	50	54	44.3	LOS E	0.1	0.1	0.94	0.94	207.3	211.9	1.02
All Pedestrians		100	107	44.3	LOS E	0.1	0.1	0.94	0.94	210.6	216.2	1.03

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: 101 [AM EX - Lugard / Castlereagh - 2026 Background Only + Stage 5 (Site Folder: Future - 2026 + Development)]

New Site
Site Category: Existing Design
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 100 seconds (Site User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.
Design Life Analysis: Constant Number of Years = 1

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Castlereagh Road (S)														
1	L2	134	13	146	9.6	0.593	28.9	LOS C	16.0	124.7	0.80	0.74	0.80	41.4
2	T1	634	88	734	15.6	* 0.593	23.8	LOS B	16.6	132.0	0.82	0.73	0.82	42.7
Approach		768	101	880	14.6	0.593	24.6	LOS B	16.6	132.0	0.81	0.74	0.81	42.5
North: Castlereagh Road (N)														
8	T1	845	101	976	13.5	0.373	5.3	LOS A	8.7	67.8	0.40	0.36	0.40	55.2
9	R2	237	28	254	11.6	* 0.432	26.0	LOS B	9.3	71.6	0.82	0.84	0.82	41.0
Approach		1082	129	1229	13.1	0.432	9.6	LOS A	9.3	71.6	0.49	0.46	0.49	51.5
West: Lugard Street (W)														
10	L2	114	17	121	15.2	0.157	22.5	LOS B	3.4	27.0	0.61	0.72	0.61	42.6
12	R2	90	9	99	10.1	* 0.380	48.2	LOS D	4.5	34.2	0.94	0.78	0.94	32.7
Approach		204	26	220	12.9	0.380	34.0	LOS C	4.5	34.2	0.76	0.75	0.76	37.5
All Vehicles		2054	256	2330	13.6	0.593	17.6	LOS B	16.6	132.0	0.64	0.59	0.64	46.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site 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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Input Vol. ped/h	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
North: Castlereagh Road (N)												
P3	Full	50	54	44.3	LOS E	0.1	0.1	0.94	0.94	213.9	220.5	1.03
West: Lugard Street (W)												
P4	Full	50	54	44.3	LOS E	0.1	0.1	0.94	0.94	207.3	211.9	1.02
All Pedestrians		100	107	44.3	LOS E	0.1	0.1	0.94	0.94	210.6	216.2	1.03

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: 101 [PM EX - Lugard / Castlereagh - 2026 Background Only + Stage 5 (Site Folder: Future - 2026 + Development)]

New Site
Site Category: Existing Design
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 100 seconds (Site User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.
Design Life Analysis: Constant Number of Years = 1

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Castlereagh Road (S)														
1	L2	55	8	59	15.9	0.527	17.7	LOS B	15.9	121.7	0.62	0.58	0.62	48.1
2	T1	1001	87	1094	10.0	* 0.527	12.2	LOS A	16.3	124.0	0.63	0.57	0.63	49.8
Approach		1056	95	1154	10.3	0.527	12.5	LOS A	16.3	124.0	0.63	0.57	0.63	49.7
North: Castlereagh Road (N)														
8	T1	817	54	890	7.6	0.333	5.4	LOS A	7.9	58.5	0.40	0.35	0.40	55.1
9	R2	91	8	97	9.1	* 0.338	14.8	LOS B	1.6	11.8	0.64	0.73	0.64	47.0
Approach		908	62	987	7.8	0.338	6.4	LOS A	7.9	58.5	0.42	0.39	0.42	54.1
West: Lugard Street (W)														
10	L2	180	13	191	7.3	0.386	37.2	LOS C	7.6	56.4	0.85	0.79	0.85	36.5
12	R2	132	8	141	6.4	* 0.497	48.1	LOS D	6.5	48.0	0.96	0.80	0.96	32.8
Approach		312	21	332	6.9	0.497	41.9	LOS C	7.6	56.4	0.90	0.79	0.90	34.8
All Vehicles		2276	178	2473	8.8	0.527	14.0	LOS A	16.3	124.0	0.58	0.53	0.58	48.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site 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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Input Vol. ped/h	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
North: Castlereagh Road (N)												
P3	Full	50	54	44.3	LOS E	0.1	0.1	0.94	0.94	213.9	220.5	1.03
West: Lugard Street (W)												
P4	Full	50	54	44.3	LOS E	0.1	0.1	0.94	0.94	207.3	211.9	1.02
All Pedestrians		100	107	44.3	LOS E	0.1	0.1	0.94	0.94	210.6	216.2	1.03

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: 101 [AM EX - Lugard / Castlereagh - 2036 Background Only (Site Folder: Future - 2036)]

New Site
Site Category: Existing Design
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 100 seconds (Site User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.
Design Life Analysis: Constant Number of Years = 1

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Castlereagh Road (S)														
1	L2	53	1.9	63	2.2	0.384	15.6	LOS B	10.1	78.6	0.54	0.52	0.54	49.5
2	T1	634	13.9	770	15.6	* 0.384	10.3	LOS A	10.2	80.7	0.54	0.50	0.54	51.0
Approach		687	13.0	833	14.6	0.384	10.7	LOS A	10.2	80.7	0.54	0.50	0.54	50.9
North: Castlereagh Road (N)														
8	T1	845	12.0	1023	13.5	0.391	5.4	LOS A	9.3	72.4	0.41	0.37	0.41	55.1
9	R2	49	0.0	58	0.0	* 0.138	11.7	LOS A	0.9	6.0	0.49	0.67	0.49	49.2
Approach		894	11.3	1081	12.7	0.391	5.7	LOS A	9.3	72.4	0.41	0.38	0.41	54.8
West: Lugard Street (W)														
10	L2	13	15.4	16	17.3	0.035	34.6	LOS C	0.6	4.5	0.76	0.68	0.76	37.3
12	R2	46	4.3	55	5.0	* 0.205	46.7	LOS D	2.4	17.6	0.91	0.75	0.91	33.3
Approach		59	6.8	71	7.7	0.205	44.0	LOS D	2.4	17.6	0.88	0.73	0.88	34.1
All Vehicles		1640	11.8	1985	13.3	0.391	9.2	LOS A	10.2	80.7	0.48	0.44	0.48	52.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site 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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Input Vol. ped/h	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
North: Castlereagh Road (N)												
P3	Full	50	54	44.3	LOS E	0.1	0.1	0.94	0.94	213.9	220.5	1.03
West: Lugard Street (W)												
P4	Full	50	54	44.3	LOS E	0.1	0.1	0.94	0.94	207.3	211.9	1.02
All Pedestrians		100	107	44.3	LOS E	0.1	0.1	0.94	0.94	210.6	216.2	1.03

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: 101 [PM EX - Lugard / Castlereagh - 2036 Background Only (Site Folder: Future - 2036)]

New Site
Site Category: Existing Design
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 100 seconds (Site User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.
Design Life Analysis: Constant Number of Years = 1

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Castlereagh Road (S)														
1	L2	25	5	29	22.5	0.528	17.2	LOS B	16.0	122.0	0.61	0.56	0.61	48.4
2	T1	1001	87	1147	10.0	* 0.528	11.7	LOS A	16.4	124.3	0.62	0.56	0.62	50.2
Approach		1026	92	1176	10.3	0.528	11.8	LOS A	16.4	124.3	0.61	0.56	0.61	50.2
North: Castlereagh Road (N)														
8	T1	817	54	933	7.6	0.344	5.1	LOS A	8.1	60.1	0.39	0.35	0.39	55.3
9	R2	23	2	26	10.0	* 0.093	13.4	LOS A	0.4	2.9	0.55	0.67	0.55	47.8
Approach		840	56	959	7.7	0.344	5.4	LOS A	8.1	60.1	0.39	0.35	0.39	55.1
West: Lugard Street (W)														
10	L2	47	1	53	2.5	0.108	35.1	LOS C	2.0	14.0	0.79	0.73	0.79	37.4
12	R2	75	3	85	4.6	* 0.316	47.6	LOS D	3.8	27.8	0.93	0.77	0.93	33.0
Approach		122	4	139	3.8	0.316	42.8	LOS D	3.8	27.8	0.88	0.75	0.88	34.5
All Vehicles		1988	152	2274	8.8	0.528	11.0	LOS A	16.4	124.3	0.54	0.48	0.54	50.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site 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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Input Vol. ped/h	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
North: Castlereagh Road (N)												
P3	Full	50	54	44.3	LOS E	0.1	0.1	0.94	0.94	213.9	220.5	1.03
West: Lugard Street (W)												
P4	Full	50	54	44.3	LOS E	0.1	0.1	0.94	0.94	207.3	211.9	1.02
All Pedestrians		100	107	44.3	LOS E	0.1	0.1	0.94	0.94	210.6	216.2	1.03

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: 101 [AM EX - Lugard / Castlereagh - 2026 Background Only + Full Yield (Site Folder: Future - 2036 + Development)]

New Site
Site Category: Existing Design
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 100 seconds (Site User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.
Design Life Analysis: Constant Number of Years = 1

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Castlereagh Road (S)														
1	L2	124	7	138	5.6	0.526	23.8	LOS B	15.3	118.9	0.73	0.69	0.73	44.1
2	T1	648	89	785	15.4	* 0.526	18.5	LOS B	15.3	118.9	0.73	0.67	0.73	45.6
Approach		772	96	922	14.0	0.526	19.3	LOS B	15.3	120.8	0.73	0.67	0.73	45.3
North: Castlereagh Road (N)														
8	T1	866	104	1045	13.5	0.399	5.4	LOS A	9.6	74.6	0.41	0.37	0.41	55.1
9	R2	154	4	169	2.5	* 0.320	14.2	LOS A	2.8	19.9	0.65	0.75	0.65	47.5
Approach		1020	108	1214	12.0	0.399	6.7	LOS A	9.6	74.6	0.44	0.42	0.44	53.9
West: Lugard Street (W)														
10	L2	120	18	128	15.2	0.197	27.3	LOS B	4.1	32.7	0.70	0.74	0.70	40.3
12	R2	110	12	122	10.8	* 0.473	49.0	LOS D	5.7	43.3	0.96	0.79	0.96	32.5
Approach		230	30	251	13.1	0.473	37.9	LOS C	5.7	43.3	0.83	0.77	0.83	36.1
All Vehicles		2022	234	2387	12.9	0.526	14.8	LOS B	15.3	120.8	0.60	0.55	0.60	47.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site 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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Input Vol. ped/h	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
North: Castlereagh Road (N)												
P3	Full	50	54	44.3	LOS E	0.1	0.1	0.94	0.94	213.9	220.5	1.03
West: Lugard Street (W)												
P4	Full	50	54	44.3	LOS E	0.1	0.1	0.94	0.94	207.3	211.9	1.02
All Pedestrians		100	107	44.3	LOS E	0.1	0.1	0.94	0.94	210.6	216.2	1.03

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: 101 [PM EX - Lugard / Castlereagh - 2026 Background Only + Full Yield (Site Folder: Future - 2036 + Development)]

New Site
Site Category: Existing Design
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 100 seconds (Site User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.
Design Life Analysis: Constant Number of Years = 1

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Castlereagh Road (S)														
1	L2	96	11	104	12.4	0.587	18.9	LOS B	18.8	143.5	0.67	0.64	0.67	47.2
2	T1	1015	88	1162	9.9	* 0.587	13.5	LOS A	19.2	146.1	0.67	0.62	0.67	48.9
Approach		1111	99	1266	10.1	0.587	13.9	LOS A	19.2	146.1	0.67	0.62	0.67	48.7
North: Castlereagh Road (N)														
8	T1	845	57	963	7.7	0.365	6.0	LOS A	9.0	67.4	0.42	0.38	0.42	54.6
9	R2	72	12	78	16.9	* 0.322	16.3	LOS B	1.4	11.3	0.68	0.73	0.68	45.9
Approach		917	69	1040	8.4	0.365	6.8	LOS A	9.0	67.4	0.44	0.40	0.44	53.8
West: Lugard Street (W)														
10	L2	187	14	201	7.5	0.392	36.5	LOS C	7.9	58.9	0.85	0.79	0.85	36.8
12	R2	159	11	174	7.1	* 0.578	48.0	LOS D	8.0	59.7	0.97	0.81	0.97	32.8
Approach		346	25	374	7.3	0.578	41.8	LOS C	8.0	59.7	0.91	0.80	0.91	34.8
All Vehicles		2374	193	2680	9.1	0.587	15.0	LOS B	19.2	146.1	0.61	0.56	0.61	47.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site 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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Input Vol. ped/h	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
North: Castlereagh Road (N)												
P3	Full	50	54	44.3	LOS E	0.1	0.1	0.94	0.94	213.9	220.5	1.03
West: Lugard Street (W)												
P4	Full	50	54	44.3	LOS E	0.1	0.1	0.94	0.94	207.3	211.9	1.02
All Pedestrians		100	107	44.3	LOS E	0.1	0.1	0.94	0.94	210.6	216.2	1.03

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: 101 [AM EX - Lugard / Castlereagh - 2026 Background Only + Full Yield - (Sensitivity) (Site Folder: Future - 2036 + Development)]

New Site
Site Category: Existing Design
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 100 seconds (Site User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.
Design Life Analysis: Constant Number of Years = 1

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Castlereagh Road (S)														
1	L2	238	17	355	7.5	0.662	24.5	LOS B	21.6	164.9	0.79	0.78	0.79	42.9
2	T1	671	91	828	15.1	* 0.662	20.1	LOS B	21.6	164.9	0.81	0.75	0.81	44.5
Approach		909	108	1184	12.8	0.662	21.4	LOS B	21.6	167.2	0.80	0.76	0.80	44.0
North: Castlereagh Road (N)														
8	T1	866	104	1056	13.5	0.404	5.5	LOS A	9.7	75.8	0.41	0.37	0.41	55.0
9	R2	154	4	224	2.8	* 0.485	19.7	LOS B	6.2	44.7	0.88	0.82	0.88	44.3
Approach		1020	108	1280	11.6	0.485	8.0	LOS A	9.7	75.8	0.49	0.45	0.49	52.8
West: Lugard Street (W)														
10	L2	120	18	185	15.2	0.283	28.2	LOS B	6.2	48.8	0.73	0.76	0.73	40.0
12	R2	110	12	156	11.9	* 0.608	50.2	LOS D	7.4	57.2	0.98	0.81	1.00	32.1
Approach		230	30	341	13.6	0.608	38.3	LOS C	7.4	57.2	0.84	0.79	0.85	36.0
All Vehicles		2159	246	2805	12.4	0.662	17.3	LOS B	21.6	167.2	0.67	0.62	0.67	46.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site 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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Input Vol. ped/h	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
North: Castlereagh Road (N)												
P3	Full	50	54	44.3	LOS E	0.1	0.1	0.94	0.94	213.9	220.5	1.03
West: Lugard Street (W)												
P4	Full	50	54	44.3	LOS E	0.1	0.1	0.94	0.94	207.3	211.9	1.02
All Pedestrians		100	107	44.3	LOS E	0.1	0.1	0.94	0.94	210.6	216.2	1.03

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: 101 [PM EX - Lugard / Castlereagh - 2026 Background Only + Full Yield - (Sensitivity) (Site Folder: Future - 2036 + Development)]

New Site
Site Category: Existing Design
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 100 seconds (Site User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.
Design Life Analysis: Constant Number of Years = 1

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Castlereagh Road (S)														
1	L2	96	11	141	11.4	* 0.778	30.3	LOS C	26.9	205.0	0.90	0.85	0.93	41.0
2	T1	1015	88	1169	9.9	0.778	25.1	LOS B	27.5	209.1	0.91	0.84	0.93	42.2
Approach		1111	99	1310	10.1	0.778	25.6	LOS B	27.5	209.1	0.91	0.84	0.93	42.1
North: Castlereagh Road (N)														
8	T1	845	57	977	7.7	0.572	21.2	LOS B	17.4	129.9	0.79	0.70	0.79	44.5
9	R2	66	6	94	9.5	* 0.921	76.3	LOS F	6.1	46.4	1.00	1.05	1.61	26.2
Approach		911	63	1072	7.9	0.921	26.1	LOS B	17.4	129.9	0.81	0.73	0.86	41.9
West: Lugard Street (W)														
10	L2	187	14	274	8.0	0.372	27.0	LOS B	9.2	68.6	0.73	0.78	0.73	40.6
12	R2	159	11	218	7.6	0.295	26.2	LOS B	7.0	52.2	0.70	0.77	0.70	40.8
Approach		346	25	492	7.8	0.372	26.6	LOS B	9.2	68.6	0.72	0.77	0.72	40.7
All Vehicles		2368	187	2874	8.9	0.921	26.0	LOS B	27.5	209.1	0.84	0.79	0.87	41.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site 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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Input Vol. ped/h	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
North: Castlereagh Road (N)												
P3	Full	50	54	44.3	LOS E	0.1	0.1	0.94	0.94	213.9	220.5	1.03
West: Lugard Street (W)												
P4	Full	50	54	44.3	LOS E	0.1	0.1	0.94	0.94	207.3	211.9	1.02
All Pedestrians		100	107	44.3	LOS E	0.1	0.1	0.94	0.94	210.6	216.2	1.03

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
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