NORTHROP

CIVIL ENGINEERING REPORT:
TRAFFIC IMPACT ASSESSMENT

Casey Apartments

Block 9 Section 132, Casey

PREPARED FOR
Jega
LG08/17 The Causeway
Kingston ACT 2604

Ref: CR220895_EC01
Rev: 1.3
Date: 23.01.2022

Traffic Impact Assessment Report

Revision Schedule

Date	Revision	Issue	Prepared By	Approved By
14.09.2022	1.0	Development Application	N.Grinter	M.Pike
07.10.2022	1.1	Development Application V1	N.Grinter	M.Pike
21.12.2022	1.2	Development Application V2	N.Grinter	M.Pike
23.01.2023	1.3	Development Application V2	N.Grinter	M.Pike

Northrop Consulting Engineers Pty Ltd

ACN 064 775 088 | ABN 81 094 433 100

SAP House, Level 6, 224 Bunda Street (PO Box 213), Canberra ACT 2608

02 6285 1822 | canberra@northrop.com.au | www.northrop.com.au

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1. Introduction

1.1 Purpose of Report

Northrop Consulting Engineers Pty Ltd (Northrop) have been engaged by Jega to prepare a Traffic Impact Assessment (TIA) for the proposed development on Block 9 Section 132, Casey (referred to as to the subject site in this report).

This TIA investigates the impact which the additional traffic to the area will have on the current surrounding vicinity.

1.2 Study Objectives

This TIA is in line with the intent of the ACT Government Transport Canberra and City Services Directorate (TCCS) Guidelines for Transport Impact Assessment (Version 3.1, April 2020) as well as the Austroads Guide to Traffic Management Part 12: Integrated Transport Assessments for Developments (2020).

This TIA will detail the below:

- An introduction to the report and summary of the proposed development;
- A summary of the development site and nearby conditions;
- An investigation in the existing conditions of the site and key roads including:
  - Traffic Volumes and conditions at key intersections;
  - Public transport within the vicinity of the site;
  - Active travel within the vicinity of the site.
- A summary of the projected traffic and parking conditions from the proposed development and surrounding key roads and intersections including:
  - The trip generation, trip distribution, modal split and trip assignment for the site generated traffic;
  - The increase of traffic at the key intersections;
  - The car park generation on site against the amount of car parking required; and
  - Car park compliance commentary.
- A transportation analysis including:
  - Commentary on proposed site access locations;
  - Commentary on the SIDRA Intersections models completed by Northrop for the key intersections for the base case, development conditions and future conditions for the site; and
  - Commentary on the current accident data for the key roads near the site supplied from the Transport Canberra and City Services Directorate (TCCS).
- A summary of the findings regarding:
  - Site accessibility;
  - Transportation impacts; and
  - Parking impacts.

The key intersections for this TIA are:

- Kingsland Parade and Bentley Place;
- Kingsland Parade and Clarrie Hermes Drive; and
- Horse Park Drive and Overall Avenue.

The key roads for this TIA are:

- Kingsland Parade between Clarrie Hermes Drive and Dallin Crescent North; and
- Bentley Place.

1.3 References

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

- Inspections of the site and its surroundings;
- ACT Government TCCS Guidelines for Transport Impact Assessment (Version 3.1, April 2020);
- Austroads Guide to Traffic Management Part 12: Integrated Transport Assessments for Developments (2020)
- Traffic surveys as undertaken by Matrix Traffic and Transport Data as referenced in the context of this report;
- AS2890.1:2004 Parking facilities Part 1: Off-street car parking;
- AS2890.2:2018 Parking facilities Part 2: Off-street commercial vehicle facilities;
- ACT Planning and Land Authority Parking and Vehicular Access General Code (June, 2022);
- NSW Transport Roads & Maritime Services Guide to Traffic Generating Developments Updated Traffic Surveys (August, 2013);
- NSW Transport Roads & Maritime Services (RTA) Guide to Traffic Generating Developments – V2.2 (October, 2002); and
- Other documents as referenced by this report.

2. Proposed Development

2.1 Surrounding Area

The proposed development is located within the suburb of Casey in Canberra. In the vicinity of the subject site, the surrounding land use is generally residential in nature. Nearby points of interests include the following:

- The Casey Market Town Shops at Block 3, Section 131 Casey;
- The car park available to the public located at Block 10, Section 132 Casey; and
- The 7 Eleven Petrol Station located at Block 6, Section 132 Casey.

The nearby points of interest and their location in relation to the site are shown in Figure 1.

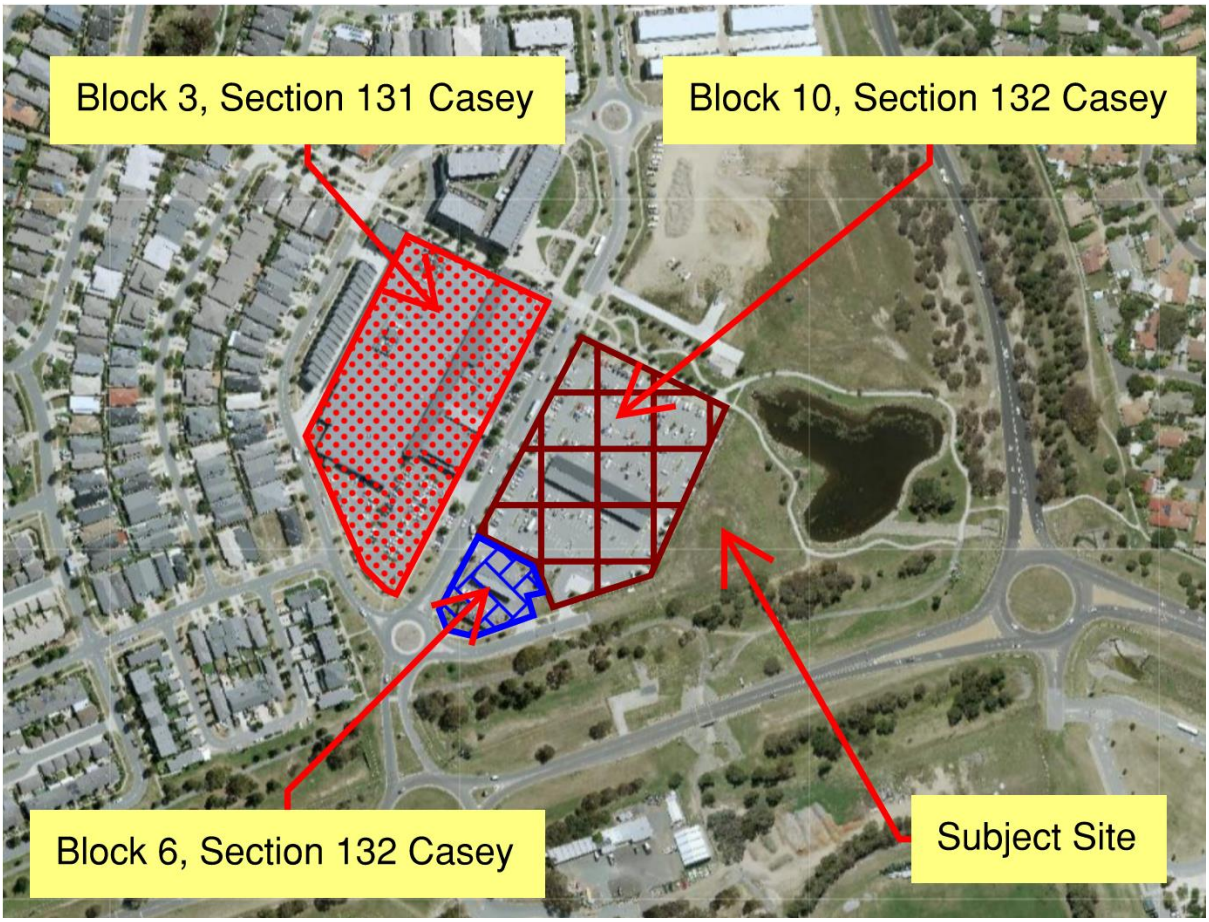

Figure 1 Nearby Points of Interest to the Site

2.2 Development Description and Locality

The proposed development will include a new multi-storey mixed-use building comprising of commercial/retail space, 219 residential units, bicycle parking and basement parking. An extract of drawing DA-20-04 Revision 2 by Cox Architecture (dated 21/09/2022) is shown in Figure 2. The proposed development is anticipated to have a gross floor area (GFA) of approximately 27,914m2 in accordance with drawing DA-01-02 Revision 3 by Cox Architecture (dated 21/09/2022).

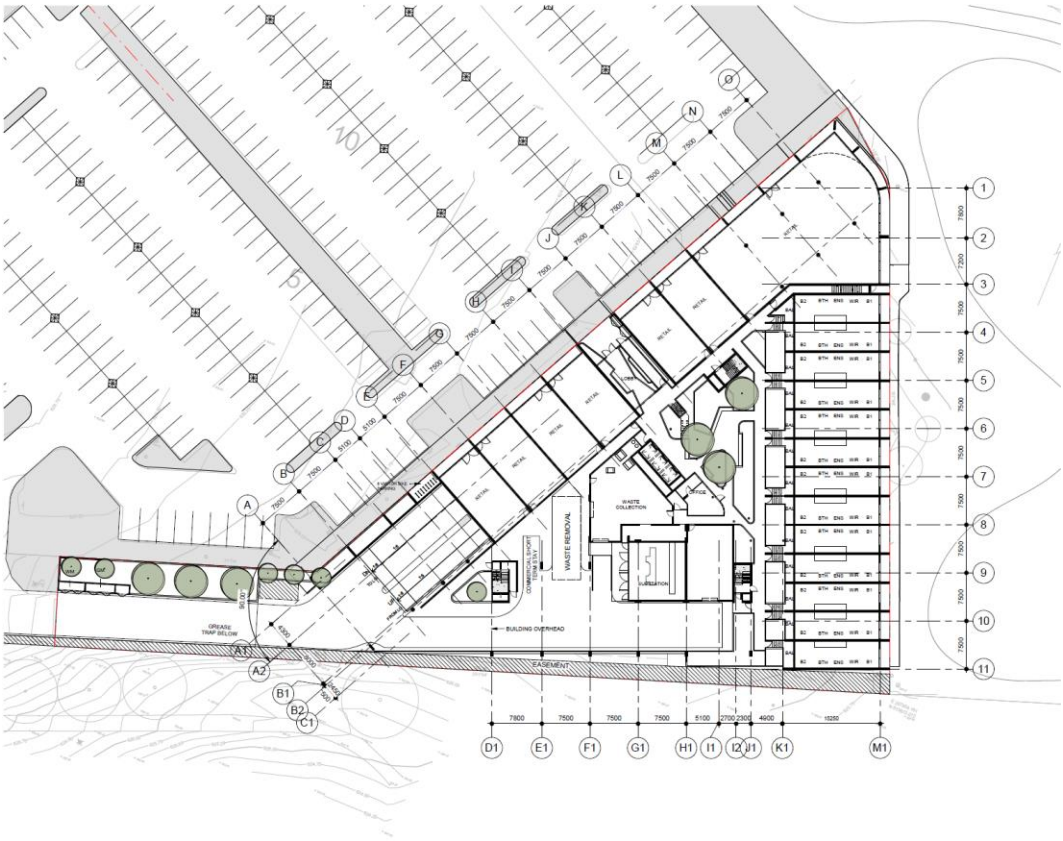

Figure 2 – Proposed Development Upper Ground Plan

The subject site is located on Block 9, Section 132 Casey which is off Bentley Place. Figure 3 shows the general site within the Casey area and Figure 4 shows the site-specific location.

Figure 3 Site Locality within Casey (Source: Metromaps, February 2022)

Figure 4 Site Specific Location (Source: ACTMapi, February 2022)

Figure 5 illustrates the locality of the subject site in relation to the key roads and intersections outlined in Section 1.2 of this report. The key intersections have a red circle on them for identification purposes in Figure 5.

Figure 5 Key Roads and Intersections in relation to the Subject Site (Source: ACTMapi, February 2022)

3. Existing Conditions

3.1 Study Area

3.1.1 Area of Influence

For the purpose of this TIA Report, the key roads and intersections of interest are as follows:

Key Roads:

- Kingsland Parade between Clarrie Hermes Drive and Dallin Crescent; and
- Bentley Place.

Key Intersections:

- Kingsland Parade and Bentley Place;
- Kingsland Parade and Clarrie Hermes Drive; and
- Horse Park Drive and Overall Avenue.

3.2 Study Area Land Use

3.2.1 Existing Land Use

At the time of this TIA, the subject site is a vacant block of land.

3.2.2 Existing Zoning

The subject site is zoned in the ACT Government Territory Plan as CZ1: Core Zone. Northrop understand that the land is within the Casey Group Centre.

3.3 Site Accessibility

3.3.1 Area Roadway System

3.3.1.1 Existing Roads Hierarchy

The subject site can be accessed via Bentley Place from the Eastern leg of the Kingsland Parade and Bentley Place intersection. The hierarchy of these roads are defined as follows in accordance with Active Travel Infrastructure Planning Map (accessed on the 18/12/2022):

- Kingsland Parade – Minor Collector
- Bentley Place – Local Access Street (Access Street)

TCCS Municipal Infrastructure Standards (MIS) 01 Street Planning and Design Edition 1 Revision 1 described a Minor Collector and an Access Road as follows:

- **Minor Collector:** Minor collector roads distribute traffic from Access Streets to Major Collector or Arterial Roads.
- **Access Streets:** Access Streets are used where the residential environment is dominant, traffic is subservient, speed and volumes are low and pedestrian and cycle movements are facilitated.

3.3.1.2 Existing Traffic Infrastructure and Traffic Controls for the Key Roads

3.3.1.2.1 Kingsland Parade

Between Clarrie Hermes Drive and Dallin Crescent (North), Kingsland Parade is aligned in a North/South direction. It is a two lane – two way road with a carriageway of an approximate width of 10.0m. Kingsland Parade between Clarrie Hermes Drive and Dallin Crescent (North) has a posted speed limit of 40 km/h.

There are indented parking bays (90 degree and parallel bays) as well as two bus laybys along this section of Kingsland Parade.

3.3.1.2.2 Bentley Place

Bentley place is aligned in an East/West direction. It is a two lane - two way road with a carriageway of an approximate width of 7.0m. Bentley Place between Kingsland Parade and the subject site has a posted speed of 40km/h.

3.4 Traffic Volumes and Conditions

3.4.1 Current Traffic Volumes

Matrix Traffic and Transport Data (Matrix) were engaged by Northrop to undertake a traffic survey for the key intersections over a Thursday between 6am to 10am and 2:30pm to 6:30pm and a Saturday between 7am to 3pm.

3.4.1.1 Current Traffic Volumes at the Intersection of Kingsland Parade, Dallin Crescent and Bentley Place

The traffic survey outlining the traffic volumes at the roundabout intersection of Kingsland Parade, Dallin Crescent and Bentley Place for the 27/10/2022 (Thursday) and the 29/10/2022 (Saturday) are summarised in Table 1 and Table 2 respectively.

Table 1: Traffic Volumes on Thursday 27/10/2022

Road	Location	Direction	AM Volume (as surveyed)	PM Volume (as surveyed)	AM Peak Volume (veh/hr)	PM Peak Volume (veh/hr)
Kingsland Parade	Northern Leg	Northbound	737	1,529	226	438
		Southbound	559	877	221	240
Bentley Place	Eastern Leg	Eastbound	41	139	12	46
		Westbound	425	702	122	217
Kingsland Parade	Southern Leg	Northbound	703	1,566	217	447
		Southbound	1,003	1,416	354	388
Dallin Crescent	Western Leg	Eastbound	214	192	83	57
		Westbound	120	253	51	89

Note:

1. *The AM and PM Peak Periods have been identified to be between 8:15am to 9:15am and 5:30pm to 6:30pm respectively.*
2. *The entry to Bentley Place has a low vehicular usage compared with the remainder of the legs of the intersection.*

Table 2: Traffic Volumes on Saturday 29/10/2022 2022

Road	Location	Direction	8-hour Volume (as surveyed)	AM Peak Volume (veh/h)	PM Peak Volume (veh/hr)
Kingsland Parade	Northern Leg	Northbound	2,198	308	357
		Southbound	1,477	227	217
Bentley Place	Eastern Leg	Eastbound	215	38	38
		Westbound	1,167	178	219
Kingsland Parade	Southern Leg	Northbound	2,249	331	388
		Southbound	2,517	394	400
Dallin Crescent	Western Leg	Eastbound	400	65	40
		Westbound	363	61	69

Note:

1. *The AM and PM Peak Periods have been identified to be between 11:00am to 12:00pm and 12:15pm to 1:15pm respectively.*
2. *The entry to Bentley Place has a low vehicular usage compared with the remainder of the legs of the intersection.*

3.4.1.2 *Current Traffic Volumes at the Intersection of Kingsland Parade and Clarrie Hermes Drive*

The traffic survey outlining the traffic volumes at the roundabout intersection of Kingsland Parade and Clarrie Hermes Drive for the 10/11/2022 (Thursday) and the 12/11/2022 (Saturday) are summarised in Table 3 and Table 4 respectively.

Table 3: Traffic Volumes on Thursday 10/11/2022

Road	Location	Direction	AM Volume (as surveyed)	PM Volume (as surveyed)	AM Peak Volume (veh/hr)	PM Peak Volume (veh/hr)
Kingsland Parade	Northern Leg	Northbound	636	1,571	189	405
		Southbound	979	1,404	299	353
Clarrie Hermes Drive	Eastern Leg	Eastbound	2,021	3,002	718	782
		Westbound	2,313	3,257	737	950
Playing Field Access	Southern Leg	Northbound	63	129	33	64
		Southbound	66	184	38	45
Clarrie Hermes Drive	Western Leg	Eastbound	1,823	3,261	630	859
		Westbound	2,455	3,294	754	994

Note:

1. *The AM and PM Peak Periods have been identified to be between 8:00am to 9:00am and 3:15pm to 4:15pm respectively.*
2. *Insignificant traffic utilised the Southern let of the intersection during the surveyed periods.*
3. *Clarrie Hermes Drive has the largest number of vehicles travelling along it at this intersection.*

Table 4: Traffic Volumes on Saturday 12/11/2022 2022

Road	Location	Direction	8-hour Volume (as surveyed)	AM Peak Volume (veh/h)	PM Peak Volume (veh/hr)
Kingsland Parade	Northern Leg	Northbound	2,289	368	380
		Southbound	2,584	397	428
Clarrie Hermes Drive	Eastern Leg	Eastbound	4,695	688	737
		Westbound	5,002	754	824
Playing Field Access	Southern Leg	Northbound	213	17	75
		Southbound	222	23	28
Clarrie Hermes Drive	Western Leg	Eastbound	4,658	704	708
		Westbound	5,251	797	888

Note:

1. *The AM and PM Peak Periods have been identified to be between 11:00am to 12:00pm and 12:00pm to 1:00pm respectively.*
2. *Insignificant traffic utilised the Southern let of the intersection during the surveyed periods.*
3. *Clarrie Hermes Drive has the largest number of vehicles travelling along it at this intersection.*

3.4.1.3 Current Traffic Volumes at the Intersection of Horse Park Drive and Overall Avenue

The traffic survey outlining the traffic volumes at the roundabout intersection of Horse Park Drive and Overall Avenue for the 27/10/2022 (Thursday) and the 29/10/2022 (Saturday) are summarised in Table 5 and Table 6 respectively.

Table 5: Traffic Volumes on Thursday 27/10/2022

Road	Location	Direction	AM Volume (as surveyed)	PM Volume (as surveyed)	AM Peak Volume (veh/hr)	PM Peak Volume (veh/hr)
Horse Park Drive	Northern Leg	Northbound	1,578	2.860	532	900
		Southbound	2,476	2,306	967	615
Newlop Street	Eastern Leg	Eastbound	195	517	79	166
		Westbound	451	455	178	145
Horse Park Drive	Southern Leg	Northbound	1,398	2,923	498	913
		Southbound	2,560	2,079	951	533
Overall Avenue	Western Leg	Eastbound	886	1,141	340	345
		Westbound	878	1,369	421	419

Note:

1. *The AM and PM Peak Periods have been identified to be between 8:00am to 9:00am and 5:15pm to 6:15pm respectively.*
2. *The majority of traffic flows along Horse Park Drive.*
3. *Vehicles appear to be rat running through Overall Avenue to avoid the arterial road network. The project team notes that this is not part of the scope of this TIA and recommends Road ACT consider further investigation of the traffic volumes and speeds along Overall Avenue separate to this study.*

Table 6: Traffic Volumes on Saturday 29/10/2022 2022

Road	Location	Direction	8-hour Volume (as surveyed)	AM Peak Volume (veh/h)	PM Peak Volume (veh/hr)
Horse Park Drive	Northern Leg	Northbound	3,272	490	523
		Southbound	4,139	665	563
Newlop Street	Eastern Leg	Eastbound	695	131	119
		Westbound	812	111	119
Horse Park Drive	Southern Leg	Northbound	3,199	503	543
		Southbound	4,028	628	550
Overall Avenue	Western Leg	Eastbound	1,755	280	260
		Westbound	1,910	310	293

Note:

1. *The AM and PM Peak Periods have been identified to be between 11:00am to 12:00pm and 12:00pm to 1:00pm respectively.*
2. *The majority of traffic flows along Horse Park Drive.*

3.4.2 Current Condition of Key Intersections

The key intersections have been modelled using SIDRA Intersection 9.1. The Thursday results have been modelled due to the higher traffic volumes across the three sites being experienced on the Thursday.

For consistency, the peak hours for intersection modelling have been assumed to be 8:00am – 9:00am and 5:15pm – 6:15pm which align to the general travel times for the average working day.

A summary of the SIDRA Intersection 9.1 results are in the following sections. The results listed in this TIA include the level of service (LOS), degree of saturation (DOS), average queue length and average delay. These results provide a quantitative measure of the performance of the intersection for the period modelled.

The LOS is a rating from A (best operating conditions) to F (worst operating conditions) as described by Austroads. In accordance with the RTA Guide to Traffic Generating Developments (Version 2.2, 2022), a LOS A represents good operation of a roundabout while LOS F represents a roundabout which is at capacity. The LOS provided in the summary of results is based on the delay method for New South Wales. The LOS has been provided to allow authority analysis of the intersection in relation to intent of the ACT Government Transport Canberra and City Services Guidelines for Transport Impact Assessment (3.1 Version, April 2020). A description of the LOS for roundabouts is provided in Table 7.

Table 7 LOS Summary for Roundabouts

LOS	Average Delay per Vehicle (seconds per vehicle)	Roundabout Services Description
A	< 14	Good operation
B	15 to 28	Good with acceptable delays and space capacity
C	29 to 42	Satisfactory
D	43 to 56	Operating near capacity
E	57 to 70	At capacity
F	> 70	Over capacity

The DOS is the ratio of arrival flow of vehicles to the capacity of the leg of the intersection. The DOS has been provided to assist indicate the available capacity of the intersection/leg of the intersection.

The average queue length represents a line of vehicles waiting to proceed through an intersection including slow moving vehicles at the back of the queue. The average queue length has been provided to indicate potential effects on the surrounding road network.

The average delay, for the purpose of this TIA, is the control delay which accounts for the time lost during the negotiation of an intersection including all stop-start and slow down delays and stopping times. The average delay will be in line with the LOS provided. The average delay has been provided as a metric to show an increase in waiting times anticipated based on the results of the SIDRA Intersection 9.1 model.

Assumptions and adjustments for the SIDRA models in the following sections are as follows:

- Grading for the legs of the intersection have been left at 0% as no survey has been provided.
- Lane geometry accuracy has limitation due to the options available in the program. These have been modelled to reflect the conditions as reasonably practical.
- Initial queue demand has been set as 0.0 veh.
- No pedestrians have been modelled at the intersections to reflect observations made by Northrop on 15/12/2022. Northrop understand that pedestrians cross midblock at locations along Clarrie Hermes Drive and Kingsland Parade which is beyond the parameters of the modelling.
- Cyclists have not been modelled to reflect observations made by Northrop on 15/12/2022.

3.4.2.1 *Current Traffic Conditions at the Intersection of Kingsland Parade, Dallin Crescent and Bentley Place*

Table 8 contains the summary of results from the SIDRA Intersection 9.1 model for the current conditions of the intersection of Kingsland Parade, Dallin Crescent and Bentley Place.

Table 8 Summary SIDRA Intersection Results

Road	Leg	Period	LOS	DOS	Average Queue Length (m)	Average Delay (s)
Kingsland Parade	North	AM	A	0.17	3	1.8
		PM	A	0.18	3	2.1
Bentley Place	East	AM	A	0.12	1	3.4
		PM	A	0.19	3	3.5
Kingsland Parade	South	AM	A	0.15	2	1.7
		PM	A	0.35	6	2.1
Dallin Crescent	West	AM	A	0.08	1	5.6
		PM	A	0.08	1	6.2

In line with the summary of the results from the current conditions:

- The intersection has good operation.

3.4.2.2 *Current Traffic Conditions at the Intersection of Kingsland Parade and Clarrie Hermes Drive*

Table 9 contains the summary of results from the SIDRA Intersection 9.1 model for the current conditions of the intersection of Kingsland Parade and Clarrie Hermes Drive.

Table 9 Summary SIDRA Intersection Results

Road	Leg	Period	LOS	DOS	Average Queue Length (m)	Average Delay (s)
Kingsland Parade	North	AM	A	0.31	6	4.9
		PM	A	0.43	9	6.1
Clarrie Hermes Drive	East	AM	A	0.51	12	6.4
		PM	A	0.58	14	7.5
Playing Field Access	South	AM	A	0.04	1	9.2
		PM	A	0.03	1	8.0
Clarrie Hermes Drive	West	AM	A	0.43	8	5.4
		PM	A	0.63	16	6.0

In line with the summary of the results from the current conditions:

- The intersection has good operation.

Northrop acknowledge that observations on the 10/11/2022 showed that there were delays for the vehicles travelling East to West across the intersection of Clarrie Hermes Drive and Kingsland Parade. It was observed that the delays were experienced between 8:00am – 8:55am. Before and after the noted times, the delays were no longer observed.

It is noted that the delays observed coincided with Gold Creek School's Senior Site. There is also a signalised pedestrian crossing to the West of the intersection of Clarrie Hermes Drive and Kingsland Parade which may have caused delays to vehicles.

Modelling shows that the intersection has sufficient capacity for the current traffic volumes. It should be noted that intersection performance may be impacted by other parts of the network which may influence intersection operation. This TIA addresses the scope of a TIA as outlined in the ACT Government TCCS Guidelines for Transport Impact Assessment (Version 3.1, April 2020) as it provides commentary on the impact of the development on the surrounding intersections including the intersection of Kingsland Parade and Clarrie Hermes Drive.

Table 9 contains the results for the intersection which shows the "current conditions" as the base case, to which the impact of the development can be compared.

Northrop recommends that Roads ACT complete a study on the intersection to review the wider network issues in relation to the intersection of Kingsland Parade and Clarrie Hermes Drive separate to this TIA and implement appropriate outcomes as identified by their study.

3.4.2.3 Current Traffic Conditions at the Intersection of Horse Park Drive and Overall Avenue

Table 10 contains the summary of results from the SIDRA Intersection 9.1 model for the current conditions of the intersection of Horse Park Drive and Overall Avenue.

Table 10 Summary SIDRA Intersection Results

Road	Leg	Period	LOS	DOS	Average Queue Length (m)	Average Delay (s)
Horse Park Drive	North	AM	A	0.87	48	14.4
		PM	A	0.55	13	9.2
Newlop Street	East	AM	B	0.28	7	15.1
		PM	A	0.11	2	6.5
Horse Park Drive	South	AM	A	0.56	14	9.8
		PM	B	0.88	49	15.5
Overall Avenue	West	AM	A	0.35	6	7.2
		PM	A	0.57	15	11.1

In line with the summary of the results from the current conditions:

- The intersection has good operation.

3.5 Carparking

There are approximately 412 publicly available car parking spaces along Kingsland Parade and within the on-grade parking on Block 10 Section 132, Casey. The breakdown of these car parking spaces is summarised in Sections 3.5.1 to 3.5.2 of this report.

3.5.1 Kingsland Parade

The number of carparking spaces on Kingsland Parade are as follows:

- 2 x Disabled Parking Spaces;
- 31 x 90 Degree Indented Parking Bays (1P); and
- 3 x 3 Parallel Indented Parking Bays (Unrestricted).

3.5.2 On-grade Parking on Block 10 Section 132, Casey

The number of carparking spaces on Block 10 Section 132, Casey are as follows:

- 12 x Disabled Parking Spaces;
- 366 x Car Parking Bays (a combination of all day parking, 3-hour parking, 1 hour parking and 30-minute parking); and
- 21 x Motorcycle Bays.

3.5.3 Car Parking Survey

A car and motorcycle parking survey was undertaken during the period from 24/11/2022 through to 26/11/2022. Various times were captured over the 3 days.

General observations from the photos taken from the survey include:

- No motorcycles were observed to be parked in the designated motorcycle parking on Block 10, Section 132 Casey across the 3 days during the survey periods;
- Parking along Kingsland Parade was almost at capacity during the survey during the survey periods and has not been further considered; and
- Parking on Block 3, Section 131 Casey was almost at capacity during the survey during the survey periods and has not been further considered.

It is noted that parking along Kingsland Parade and parking on Block 3, Section 131 Casey are within close proximity to Casey Market Town shops.

Table 11 provides a summary of the car park capacity on Block 10, Section 132 Casey during the survey period.

Table 11 Car Parking Survey Summary

Day	Time	No. Cars Parked	No. Available Car Parking Spaces	Percent Available Car Parking Spaces
Thursday 24/11/2022	10:45am	137	241	63%
	11:45am	151	227	60%
	12:35pm	176	202	53%
	1:30pm	169	209	55%
Friday 25/11/2022	2:00pm	171	207	54%
	3:00pm	127	251	66%
	4:00pm	161	217	57%
	5:00pm	185	193	51%
	6:00pm	187	191	50%
Saturday 26/11/2022	10:00am	180	198	47%
	11:00am	186	192	50%
	12:00 Midday	202	176	46%
	1:00pm	215	163	43%
	2:00pm	189	189	50%
	3:00pm	182	196	51%
	4:00pm	149	229	60%

In line with the car and motorcycle parking survey undertaken:

- The Saturday was the busiest day at the car park;
- The least amount of car parking available during the surveyed times was 163 car parking spaces;
- The most amount of car parking available during the surveyed times was 251 on a Friday.

Figure 6 and Figure 7 showing the car park at its busiest time and quietest time surveyed respectively.

Figure 6 Car Parking Available Saturday 26/11/2022 1:00pm

Figure 7 Car Parking Available Friday 25/11/2022 3:00pm

3.6 Public Transport

At the time of this report, there are two bus stops situated on Kingsland Parade (Stop ID 6109 and Stop ID 6110) as shown location E in Figure 8 and Location A in Figure 9. These bus stops serve Bus Routes 25, 26, 27 and 28.

Figure 8 Route 25 and 26

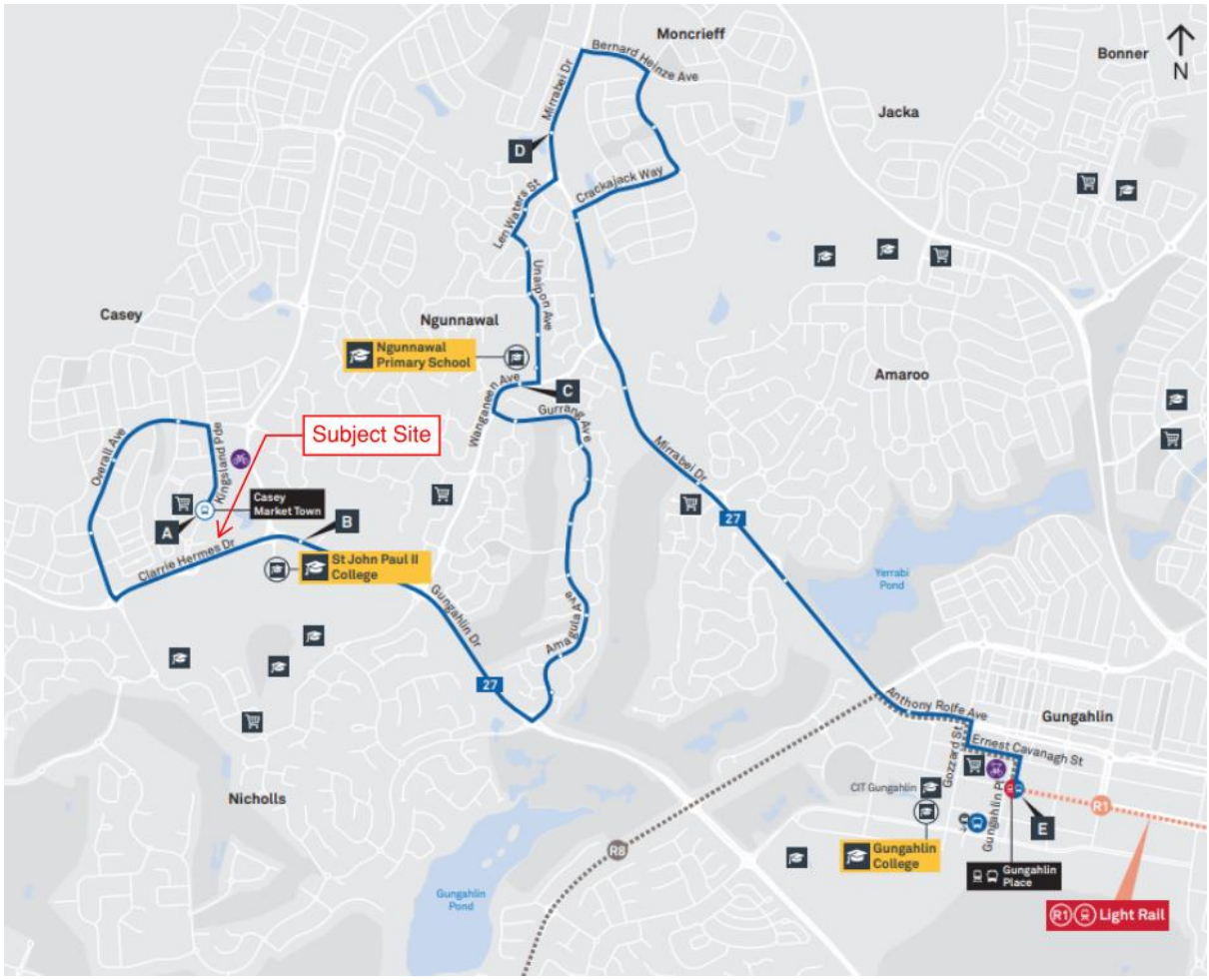

Figure 9 Route 27 and 28

Routes 25 and 26 stop at Kingsland Parade in line with the current weekday and weekend timetable. The buses depart approximately every 30 minutes during weekdays and approximately every 1 hour in the morning on Saturday's until 10:45, then every 2 hours for the rest of the weekend's timetable. It is noted that Routes 25 and 26 link with the Gungahlin Interchange.

Routes 27 and 28 stops at Kingsland Parade in line with the current weekday and weekend timetable. The buses depart approximately every 30 minutes during weekdays and approximately every hour on weekends in the morning and every 2 hours on for the rest of the weekend's timetable. It is noted that Routes 27 and 28 link with the Gungahlin Interchange.

Gungahlin Interchange provides connectivity to City Interchange and Belconnen through Transport Canberra's Rapid Routes as well as providing connection to other bus routes.

3.7 Active Travel

Public footpaths follow the verges of the streets surrounding the subject site providing access for both pedestrians and cyclists. Figure 10 is a marked-up extract from the Active Travel Practitioner Tool which indicates the existing pedestrian facilities in the vicinity of the subject site.

The public footpaths shown in Figure 10 link to the greater pedestrian footpath and active travel facilities for the greater Canberra region.

Underpasses linking Casey to Ngunnawal and Nichols are identified in Figure 10 by the red circles. The underpasses provide an alternate route for pedestrians, cyclists and users of other active travel types to miss negotiating Horse Park Drive and Clarrie Hermes Drive.

A signalised pedestrian crossing linking Casey to Nichols has been identified in Figure 10 by the orange circle. The signalised crossing enable pedestrian to cross Clarrie Hermes Drive in a controlled manner.

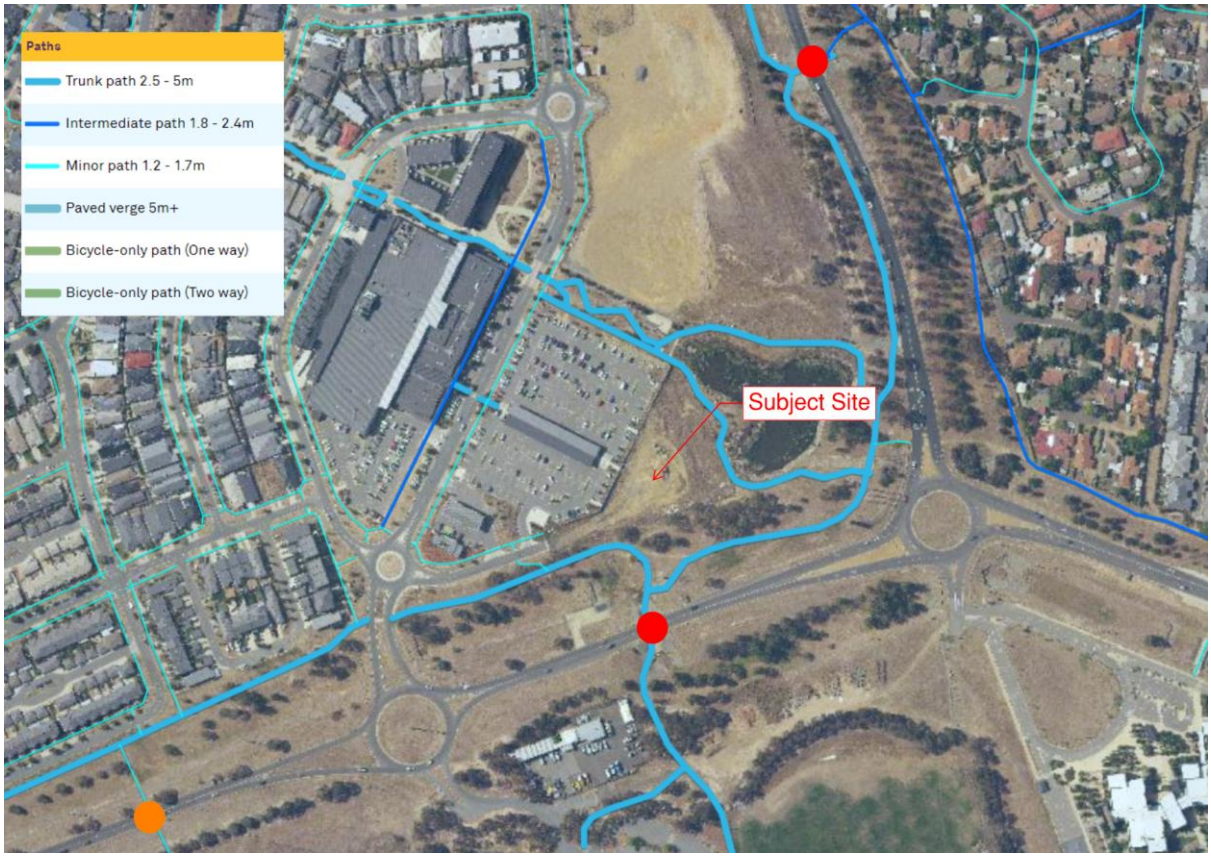

Figure 10 Pedestrian Footpath Infrastructure in the Vicinity of the Subject Site

3.8 Accident Data

Accident data has been obtained from TCCS for the period of 1/01/2016 to 31/12/2020 for the following locations:

- Bentley Place between Kingsland Parade and the Subject Site
- Kingsland Parade between Clarrie Hermes Drive and Dallin Crescent (North)

The data collected provides a typical 5-year behaviour for accidents within the abovementioned locations and is summarised in Table 12.

Table 12 Accident Data Along Clarrie Hermes Drive, Bentley Place, Kingsland Parade & Dallin Crescent

Location	Type of Accident	Number of Accidents
Intersection of Clarrie Hermes Drive and Kingsland Parade	Injury	0
	Property Damage	24
Midblock of Kingsland Parade between Bentley Place and Dallin Crescent	Injury	0
	Property Damage	12

Note:

1. *No accidents have been recorded in the mid-block of Bentley Place.*
2. *No accidents have been recorded at the midblock of Kingsland Parade between Clarrie Hermes Drive and Bentley Place.*
3. *No accidents have been recorded at the intersection of Bentley Place, Kingsland Parade and Dallin Crescent.*
4. *No accidents have been recorded at the intersection of Dallin Crescent and Kingsland Parade.*

It is noted that of the accidents recorded at the intersection of Clarrie Hermes Drive and Kingsland Parade, 58% were recorded to be rear end related (the most common crash type). Information as provided by the ACT Government does not allow a root cause for these accidents to be identified nor potential improvements to the area to be recommended. This would need to be completed as a separate study to this TIA.

It is noted that of the accidents recorded at the midblock of Kingsland Parade between Bentley Place and Dallin Crescent, 42% were recorded to be related to leaving parking spaces (the most common crash type). Information as provided by the ACT Government does not allow a root cause for these accidents to be identified nor potential improvements to the area to be recommended. This would need to be completed as a separate study to this TIA.

Under the Federal Government's Black Spot Program, for an area to be defined as a Black Spot Road (midblock or intersection) requiring modification, the road in question is required to meet the following condition:

"For individual sites such as intersections, mid-block or short road sections, there should be a history of at least three casualty crashes over a five-year period. For lengths of road, there should be an average of 0.2 casualty crashes per kilometre per annum over the length in question over five years."

In line with the data presented in Table 12, there are no black spots along Clarrie Hermes Drive, Bentley Place, Kingsland Parade and Dallin Crescent.

4. Proposed Development

4.1 Development Description

In line with Cox Architecture drawing DA-01-02 Revision 3 dated 21/09/2022, the development is a mixed-use building which contains the following:

- 6 x studio apartments;
- 18 x 1 bedroom apartments;
- 133 x 2 bedroom apartments;
- 19 x 3 bedroom apartments;
- 20 x 3 bedroom apartments with a study;
- 10 x 4 bedroom apartments with a study;
- 13 adaptive commercial apartments (for the purpose of this study, they have been modelled as 2 bedrooms); and
- 1,087m2 of retail space.

Northrop understand that the retail will be a split of approximately 478m2 shop style tenancies, 400m2 office style tenancies and 200m2 café/restaurant style tenancies.

4.2 Access

4.2.1 Driveway

Driveway access to the proposed development is off Bentley Place.

With the arrangement of the site in line with Cox Architecture drawings DA-20-04 Rev 2 (dated 21/09/2022) and DA-20-03 Rev 2 (dated 12/09/2022), there is approximate 70m between the block boundary and the basement parking control point. This exceeds the requirements of AS2890.1 for minimum queue lengths at a car park with a control point at the entrance.

4.3 Compliance to Relevant Standards

Northrop note that a full compliance review of the car park is required prior to construction of the proposed development, however can note from a preliminary review:

- Car parking spaces in blind aisles must be assigned to users;
- The basement car park mainly meets the intent of AS2890.1:2004 for residential parking and employee parking;
- A full review of the car park must be undertaken in the detailed design phase of the project to ensure full compliance to relevant standards, codes and guidelines.

4.4 Traffic Generation

The peak traffic generation has been based on the:

- ACT Government Environment and Sustainable Development Estate Development Code (28 August, 2020);
- RTA Guide to Traffic Generating Developments Version 2.2 (October, 2022); and
- NSW Government Transport Roads and Maritime Services Guide to Traffic Generating Developments Updated Traffic Surveys TDT 2013/04a (August, 2013).

The ACT Government Environment and Sustainable Development Estate Development Code (26 August, 2020) advises multiunit dwellings generate 6 vehicle movements per day per dwelling. As the

code is silent on peak hour traffic generation and other type of peak vehicle generation, we have referred to the RTA Guide to Traffic Generating Developments Version 2.2 (October, 2022) and the NSW Government Transport Roads and Maritime Services Guide to Traffic Generating Developments Updated Traffic Surveys TDT 2013/04a (August, 2013).

The RTA Guide to Traffic Generating Developments Version 2.2 (October, 2022) provides traffic generation rates for restaurants (which also reflect a similar behaviour to cafes).

The NSW Government Transport Roads and Maritime Services Guide to Traffic Generating Developments Updated Traffic Surveys TDT 2013/04a (August, 2013) provides traffic generation rates for high density residential flat dwellings, office blocks and retail (assumed shopping centre in nature due to shops in vicinity of the development).

It is noted that for the purpose of this TIA and the traffic generation, the commercial adaptive units will be classified as 2 bedroom units.

The traffic generation from the development is summarized in Table 13.

Table 13 Development Traffic Generation

Usage	No. of	Peak Generation Rate[3]	Peak Traffic	Daily Traffic Generation[3]	Daily Traffic
Residential	219	0.67 vehicle trips/unit[1]	147	6 vehicle trips/unit[3]	1,314
Restaurant/ Café	200m2	5 vehicle trips /100m2 GFA[2]	10	60 vehicle trips/100m2 GFA[2]	120
Office	400m2	1.57 vehicle trips/100m2 GFA[1]	7	18.17 vehicle trips/100m2 GFA[1]	73
Shop	478m2	6.99 vehicle trips/100m2 GFA	34	60.67 vehicle trips/100m2 GFA[1]	290

1. As per NSW Government Transport Roads and Maritime Services Guide to Traffic Generating Developments Updated Traffic Surveys TDT 2013/04a (August, 2013) using the most conservative regional value.
2. As per RTA Guide to Traffic Generating Developments Version 2.2 (October, 2022).
3. As per the ACT Government Environment and Sustainable Development Estate Development Code (26 August, 2020).

4.5 Traffic Distribution

As per section 3.4.1 of this report, the weekday peak hour periods for the intersection of Kingsland Parade and Bentley Place are:

- 8:00am – 9:00am; and
- 5:15pm – 6:15pm.

During the am peak period, it would be assumed the development would have 20% incoming traffic and 80% outgoing traffic.

During the pm peak period, it would be assumed the development would have 80% incoming traffic and 20% outgoing traffic.

With the acknowledgement of likely origins and destinations for vehicles in close proximity to the proposed development site, the following traffic distribution has been modelled as per Figure 11, Figure 12 and Figure 13. The traffic distribution shown in Figure 11 has taken into consideration the following sites which represent a local shopping hub, major public transport hub, education and the typical work locations in Canberra. It has been assumed that most drivers will travel East along Clarrie Hermes Drive to travel towards City/Belconnen/Woden/Fyshwick/Tuggernong:

- Gungahlin to the East;
- Gold Creek Highschool to the South;
- St John Paul II College to the South;
- Ngunnawal Primary School to the North East;
- City/Belconnen/Woden/Fyshwick/Tuggernong to the South.

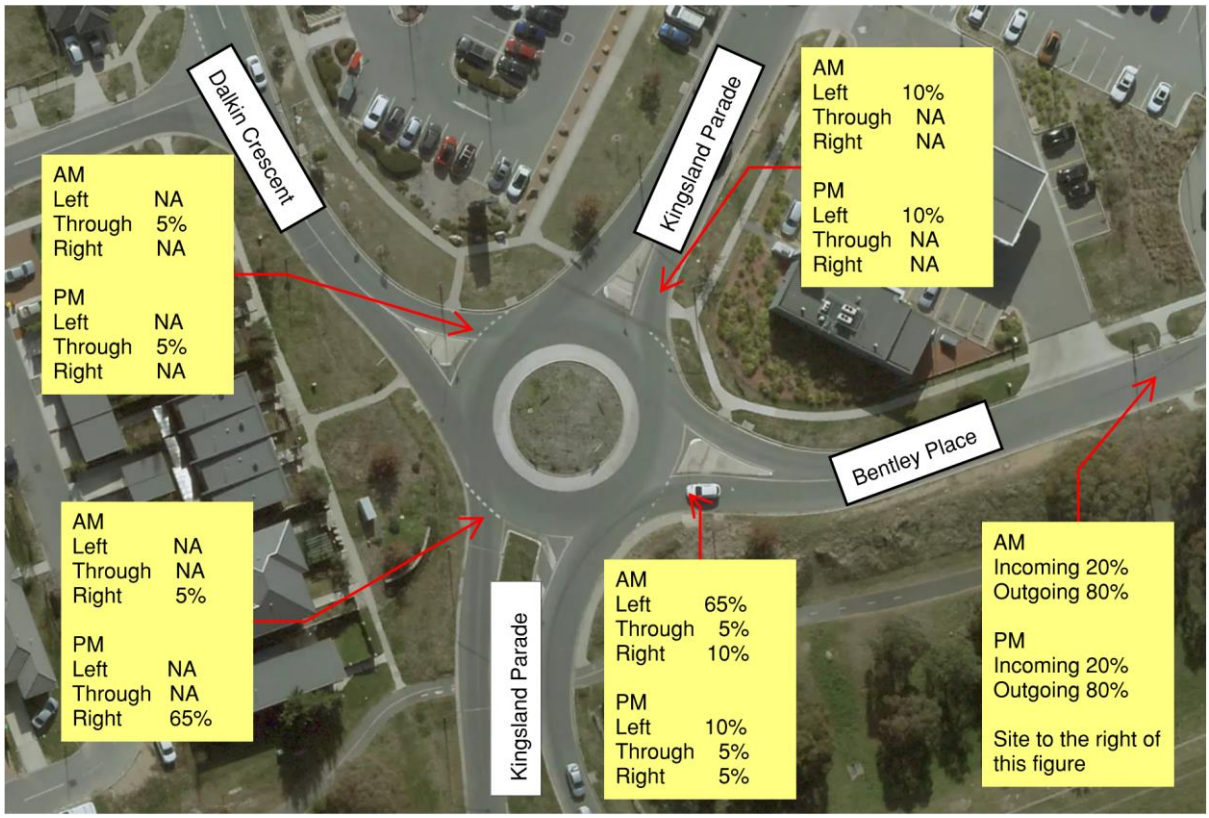

Figure 11 Proposed Development Traffic Distribution – Intersection of Kingsland Parade and Bentley Place

Figure 12 Proposed Development Traffic Distribution - Intersection of Clarrie Hermes Drive and Kingsland Parade

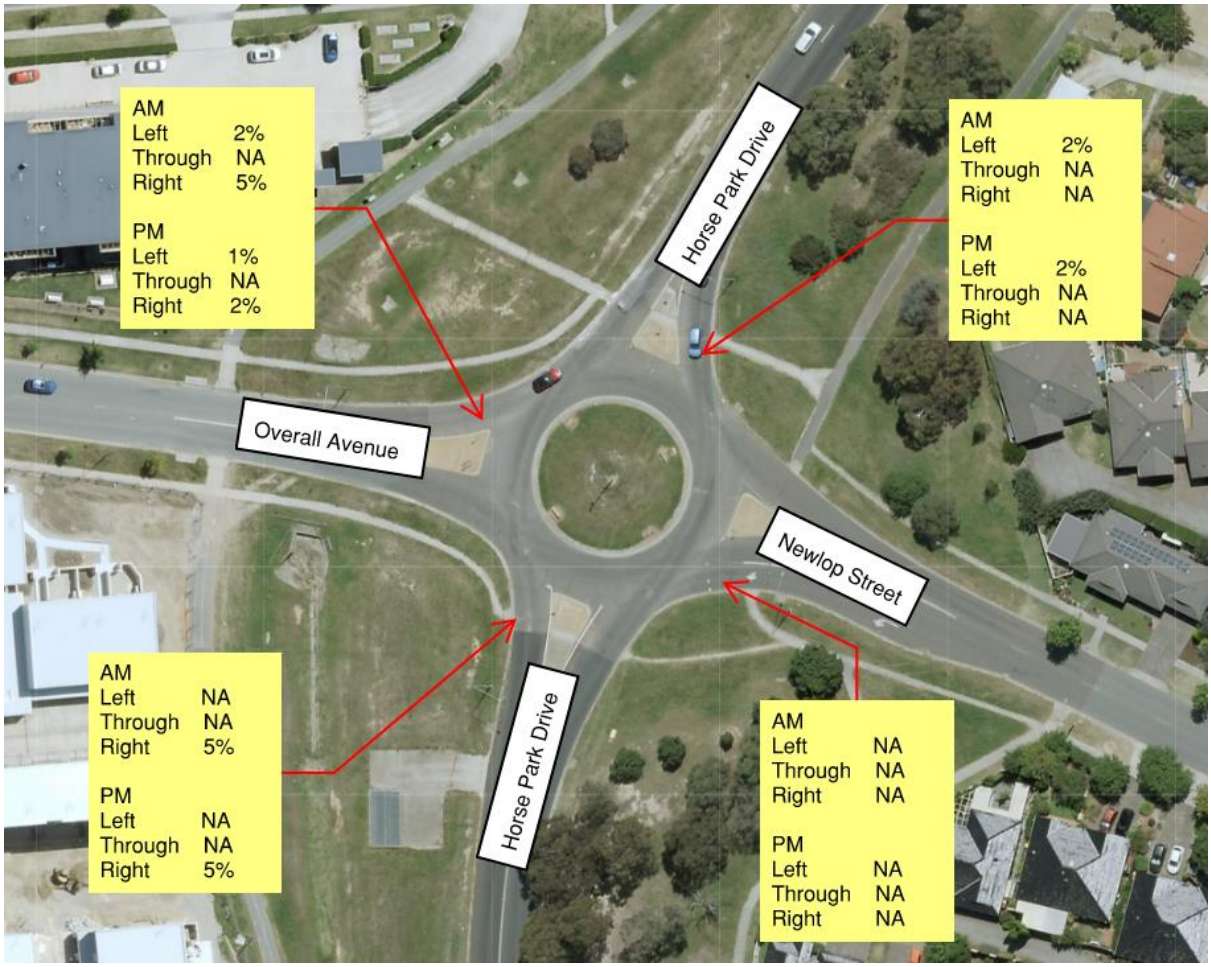

Figure 13 Proposed Development Traffic Distribution - Intersection of Horse Park Drive and Overall Avenue

4.6 Traffic Modal Split

The proposed development generally will generate passenger vehicle trips based on its residential component.

It is acknowledged there will be heavy vehicle trips which service both the residential and commercial aspects of the development, however due to the anticipated small number of trips for heavy vehicles, these have not further been considered for modelling purposes.

4.7 Traffic Impact

The performance of the key intersections have been reviewed for the development conditions and the future conditions.

For the purpose of this TIA, it has been assumed that the development year will be 2023 and the future conditions will be modelled in 2033.

The increase in traffic on the roads will increase by 2% per year as per the ACT Government TCCS Guidelines for Transport Impact Assessment (Version 3.1, April 2020).

4.7.1 Development Conditions

4.7.1.1 Development Traffic Conditions at the Intersection of Kingsland Parade, Dallin Crescent and Bentley Place

The intersection of Kingsland Parade and Bentley Place has been modelled using SIDRA Intersection 9.1 for the development conditions (2023).

A summary of the results is available in Table 14.

Table 14 SIDRA Intersection Results for the Development Case

Road	Leg	Period	LOS	DOS	Average Queue Length (m)	Average Delay (s)
Kingsland Parade	North	AM	A	0.20	3	2.2
		PM	A	0.25	4	3.0
Bentley Place	East	AM	A	0.27	4	4.6
		PM	A	0.24	4	3.7
Kingsland Parade	South	AM	A	0.20	3	2.5
		PM	A	0.48	10	3.2
Dallin Crescent	West	AM	A	0.10	2	6.3
		PM	A	0.11	2	7.3

From the results in Table 14, it can be seen that the intersection has good operation. The results in Table 14 indicate the development has an impact on the operation of the roundabout (refer to the results in Table 8), however the roundabout is in line with the ACT Government TCCS Guidelines for Transport Impact Assessment (Version 3.1, April 2020).

4.7.1.2 *Development Traffic Conditions at the Intersection of Kingsland Parade and Clarrie Hermes Drive*

The intersection of Kingsland Parade and Clarrie Hermes Drive has been modelled using SIDRA Intersection 9.1 for the development conditions (2023).

In line with Section 3.4.2.2 of this TIA, due to the limitations of SIDRA Intersection 9.1 single intersection analysis and Northrop's scope, these results are to demonstrate the impact of the development on the intersection in line with the results within this TIA.

A summary of the results is available in Table 15.

Table 15 SIDRA Intersection Results for the Development Case

Road	Leg	Period	LOS	DOS	Average Queue Length (m)	Average Delay (s)
Kingsland Parade	North	AM	A	0.45	9	5.1
		PM	A	0.48	11	6.6
Clarrie Hermes Drive	East	AM	A	0.51	12	6.1
		PM	A	0.68	19	8.5
Clarrie Hermes Drive	South	AM	A	0.04	1	9.0
		PM	A	0.04	1	10.1
Clarrie Hermes Drive	West	AM	A	0.43	8	5.3
		PM	A	0.72	23	7.8

From the results in Table 15, it can be seen that the intersection has good operation under the model conditions (refer to Section 2.4.2.2 of this TIA). The results in Table 15 indicate the development has an impact on the operation of the roundabout, however the impact does not cause inconvenience in line with the SIDRA Intersection 9.1 results.

4.7.1.3 *Development Traffic Conditions at the Intersection of Horse Park Drive and Overall Avenue*

The intersection of Horse Park Drive and Overall Avenue has been modelled using SIDRA Intersection 9.1 for the development conditions (2023).

A summary of the results is available in Table 16.

Table 16 SIDRA Intersection Results for the Development Case

Road	Leg	Period	LOS	DOS	Average Queue Length (m)	Average Delay (s)
Horse Park Drive	North	AM	B	0.91	62	17.8
		PM	A	0.58	14	9.4
Newlop Street	East	AM	B	0.34	9	16.9
		PM	A	0.12	2	6.8
Horse Park Drive	South	AM	A	0.60	16	10.5
		PM	A	0.92	65	19.7
Overall Avenue	West	AM	A	0.38	7	7.4
		PM	B	0.62	18	12.7

From the results in Table 16, it can be seen that the intersection has good operation. The results in Table 16 indicate the development has an impact on the operation of the roundabout (refer to Table 10), however the roundabout is in line with the ACT Government TCCS Guidelines for Transport Impact Assessment (Version 3.1, April 2020).

4.7.2 Future Conditions

4.7.2.1 Future Traffic Conditions at the Intersection of Kingsland Parade, Dallin Crescent and Bentley Place

The intersection of Kingsland Parade and Bentley Place has been modelled using SIDRA Intersection 9.1 for the future conditions (2033).

For the purpose of the future conditions, the development traffic generation has remained the same as the 2023 model with the external traffic being increased by the 2% growth factor only.

A summary of the results is available in Table 17.

Table 17 SIDRA Intersection Results for the Future Case

Road	Leg	Period	LOS	DOS	Average Queue Length (m)	Average Delay (s)
Kingsland Parade	North	AM	A	0.24	4	2.2
		PM	A	0.31	5	3.4
Bentley Place	East	AM	A	0.31	5	5.1
		PM	A	0.30	5	4.0
Kingsland Parade	South	AM	A	0.20	3	2.7
		PM	A	0.65	19	3.8
Dallin Crescent	West	AM	A	0.12	2	6.5
		PM	A	0.16	3	9.0

From the results in Table 17, it can be seen that the intersection has good operation in the future case modelled inclusive of the development traffic.

4.7.2.2 *Future Traffic Conditions at the Intersection of Kingsland Parade and Clarrie Hermes Drive*

The intersection of Kingsland Parade and Clarrie Hermes Drive has been modelled using SIDRA Intersection 9.1 for the future conditions (2033).

For the purpose of the future conditions, the development traffic generation has remained the same as the 2023 model with the external traffic being increased by the 2% growth factor only.

In line with Section 3.4.2.2 of this TIA, due to the limitations of SIDRA Intersection 9.1 single intersection analysis and Northrop's scope, these results are to demonstrate the impact of the future case on the intersection in line with the results in this TIA.

A summary of the results is available in Table 18.

Table 18 SIDRA Intersection Results for the Future Case

Road	Leg	Period	LOS	DOS	Average Queue Length (m)	Average Delay (s)
Kingsland Parade	North	AM	A	0.58	16	8.5
		PM	B	0.79	34	19.0
Clarrie Hermes Drive	East	AM	A	0.64	18	6.4
		PM	A	0.85	42	11.8
Clarrie Hermes Drive	South	AM	A	0.07	1	11.6
		PM	B	0.08	2	17.1
Clarrie Hermes Drive	West	AM	A	0.53	12	5.4
		PM	B	0.93	69	16.3

From the results in Table 18 , it can be seen that the intersection modelled has good operation in the am peak and operates good in the pm peak with acceptable delays and spare capacity in the future case modelled inclusive of the development traffic.

It is noted however that Clarrie Hermes Drive approaching the West of the intersection has a DOS of 0.93 and is approaching capacity.

4.7.2.3 *Development Traffic Conditions at the Intersection of Horse Park Drive and Overall Avenue*

The intersection of Horse Park Drive and Overall Avenue has been modelled using SIDRA Intersection 9.1 for the future conditions (2033).

For the purpose of the future conditions, the development traffic generation has remained the same as the 2023 model with the external traffic being increased by the 2% growth factor only.

A summary of the results is available in Table 19.

Table 19 SIDRA Intersection Results for the Future Case

Road	Leg	Period	LOS	DOS	Average Queue Length (m)	Average Delay (s)
Horse Park Drive	North	AM	F	1.18	405	175.3
		PM	A	0.72	25	11.4
Newlop Street	East	AM	B	0.47	14	25.5
		PM	A	0.18	4	8.5
Horse Park Drive	South	AM	A	0.75	27	13.7
		PM	F	1.20	408	193.0
Overall Avenue	West	AM	A	0.52	13	9.1
		PM	B	0.77	28	18.9

From the results in Table 19, it can be seen that the intersection is over capacity due to the increased delays along Horse Park Drive. Due to the limited and consistent traffic generated from the proposed development, the saturation of the intersections would be from traffic generation from other origins and destinations.

4.8 Parking

4.8.1 Car Parking

Car parking generation has been reviewed for both the residential and commercial aspects for the building.

4.8.1.1 Residential Car Parking Required

The ACT Planning & Land Authority Parking and Vehicular Access General Code (17 June, 2022) was reviewed to determine the number of car parking spaces required for the residential parking. As the block is located with a CZ1: Core Zone, the following car parking generation rates apply:

- One (1) parking space per single bedroom dwelling; and
- A minimum average provision of 1.5 spaces per two bedroom dwelling, provided that each two bedroom dwelling is allocated a minimum of one (1) parking space and each two (2) bedroom dwelling is allocated no more than two (2) parking spaces; or
- Two (2) parking spaces per two bedroom dwelling; and
- Two (2) parking spaces for each dwelling with three or more bedrooms; plus
- One (1) visitor space per four (4) dwellings or part thereof where a complex comprises four (4) or more dwellings.

This results in 341 car parking spaces being required for the residents of the proposed development.

A total of 55 visitor car parking spaces are required for the development.

4.8.1.2 Commercial Car Parking Required

Northrop understand that the retail will be a split of approximately 478m2 shop style tenancies, 400m2 office style tenancies and 200m2 café/restaurant style tenancies. The ACT Planning & Land Authority Parking and Vehicular Access General Code (17 June, 2022) describes the car parking generation rates for these uses are as follows:

- Restaurant: 10 car parking spaces per 100m2 GFA;
- Office: 2.5 car parking spaces per 100m2 GFA; and
- Shop: 5 car parking spaces per 100m2 GFA.

Based on the areas for each use, 54 car parking spaces would be required for the commercial area of the development.

4.8.2 Car Parking Provided for the Development and Alternate Parking Locations

The proposed development contains 364 car parking spaces in line with drawing DA-01-02 dated 21/09/2022 by Cox Architecture.

The basement will be able to contain the 341 car parking spaces required for the residents.

23 of the 109 commercial and residential visitor parking will be able to be located within the basement car park.

The project team has advised that the car park on Block 10, Section 132 Casey can be used to accommodate the remaining 86 car parking spaces. It is noted that Block 10, Section 132 Casey is located next to the proposed site.

In line with Section 3.5.3 of this TIA and based on the car parking survey, Block 10, Section 132 Casey has the car park capacity to accommodate the additional parking required.

4.8.3 Motorcycle Parking

The ACT Planning & Land Authority Parking and Vehicular Access General Code (17 June, 2022) nominates that 3 dedicated motorcycle/motor scooter parking spaces are required per 100 car parking spaces.

Based on 364 car parking spaces within the development, it would be anticipated that 11 dedicated motorcycle/motor scooter parking spaces are provided.

The proposed development contains 11 motorcycle parking spaces in line with drawing DA-01-02 dated 21/09/2022 by Cox Architecture.

4.8.4 Bicycle Parking

The ACT Planning & Land Authority Bicycle Parking General Code (October, 2013) was reviewed for the purpose of the proposed development. Based on this code, the following bicycle parking facilities are required:

- Residential – 1 per apartment (assumed in the storage cage of sufficient size or apartment);
- Residential visitor – 18 x class 3 spaces required;
- Office employees – 1 x class 1 or 2 space
- Office visitor – nil required;
- Restaurant employees – nil required;
- Restaurant visitors – 2 x class 3 spaces required;
- Shop employees – nil required;
- Shop visitors – 2 x class 3 spaces required.

It is noted that the latest plans detail 8 bicycle parking spaces for visitors to the development, storage cages for the residents and 18 bicycle parking spaces within the basement which has a similar nature to class 2 bicycle parking (assuming these would be unavailable to the general public but will be available to residential visitors and employees).

In line with the code, no showers or lockers are required as less than 4 employee bicycle parking spaces are required.

5. Conclusion

Northrop Consulting Engineers Pty Ltd (Northrop) have been engaged by Jega to prepare a Traffic Impact Assessment (TIA) for the proposed development on Block 9 Section 132, Casey (referred to as to the subject site in this report).

This Traffic Impact Assessment Report has detailed the below:

- An introduction to the report and summary of the proposed development;
- A summary of the development site and nearby conditions;
- An investigation in the existing conditions of the site and key roads including:
  - Traffic Volumes and conditions at key intersections;
  - Public transport within the vicinity of the site;
  - Active travel within the vicinity of the site.
- A summary of the projected traffic and parking conditions from the proposed development and surrounding key roads and intersections including:
  - The trip generation, trip distribution, modal split and trip assignment for the site generated traffic;
  - The increase of traffic at the key intersections;
  - The car park generation on site against the amount of car parking required; and
  - Car park compliance commentary.
- A transportation analysis including:
  - Commentary on proposed site access locations;
  - Commentary on the SIDRA Intersections models completed by Northrop for the key intersections for the base case, development conditions and future conditions for the site; and
  - Commentary on the current accident data for the key roads near the site supplied from the Transport Canberra and City Services Directorate (TCCS).
- A summary of the findings regarding:
  - Site accessibility;
  - Transportation impacts; and
  - Parking impacts.

This conclusion details:

- A summary of the findings regarding:
  - Site accessibility;
  - Transportation impacts; and
  - Parking impacts.

The report has identified:

- The site access is off Bentley Place for both passenger vehicles and service vehicles;
- The site connects with active travel infrastructure which links the development with the greater Canberra region;
- There are 2 bus stops which are within close vicinity of the proposed development which provide connectivity to the area and Gungahlin Interchange. Gungahlin Interchange provides connectivity to City Interchange and Belconnen through Transport Canberra's Rapid Routes as well as providing connection to other bus routes;

- There are no black spots in close vicinity to the development;
- There is existing available car parking located on Block 10, Section 132 Casey and along Kingsland Parade which provides 418 car parking spaces and 21 motorcycle parking spaces to the area;
- The car park capacity survey undertaken for this report indicated there was at least 160 car parking spaces available in Block 10, Section 132 Casey during the busiest time surveyed;
- The intersection of Kingsland Parade and Bentley Place is at good operation at the base conditions, development conditions (2023) and future conditions (2033);
- The intersection of Clarrie Hermes Drive and Kingsland Parade has been modelled based on model conditions due to limitations of SIDRA Intersections 9.1. The model indicated that the intersection has good operation at the base conditions, development conditions (2023) and future conditions (2033) however was also approaching capacity on the Western leg in the future conditions (2033). Northrop recommends that Roads ACT complete a study on the conditions of the intersection of Kingsland Parade and Clarrie Hermes Drive separate to this TIA and implement appropriate outcomes as identified by their study;
- The intersection of Horse Park Drive and Overall Avenue is at good operation at the base conditions and development conditions (2023), however is at capacity for the future conditions (2033) due to the growth in traffic generation from origins and destinations other than the proposed development;
- The basement car park has capacity for 364 car parking spaces (which accounts for all resident parking required);
- Visitor car parking not provided within the basement for the proposed development is to be provided on Block 10, Section 132 Casey which has capacity for it;
- Dedicated motorcycle/motor scooter parking spaces have been nominated on the architectural plans;
- Bicycle parking has been nominated for the proposed development for both the residential and commercial components;
- Active travel facilities such as showers and lockers are not required for the development due to the employee bicycle parking required.

Attachments

DEVELOPMENT STATISTICS

YIELD CALCULATION

UNIT TYPE	NO. UNITS	% OF UNITS
1BED	18	8.2%
2BED	133	60.7%
3BED	19	8.7%
3BED ST	20	9.1%
4BED ST	10	4.6%
ADAPTIVE COMMERCIAL	13	5.9%
STUDIO	6	2.7%
TOTAL NO. OF UNITS: 219	219	100.0%

CAR PARKING SCHEDULE

TYPE	DIMENSIONS LENGTH	DIMENSIONS WIDTH	NUMBER OF SPACES
BASEMENT 2			
Residential	5400	2400	142
Residential - Tandem	5400	2400	6
			148
BASEMENT 1			
Residential	5400	2400	106
Retail	5400	2400	16
Residential - Tandem	5400	2400	6
Residential Adaptable	5400	2400	11
			139
LOWER GROUND			
Residential	5400	2400	65
Residential Adaptable	5400	2400	11
			76
UPPER GROUND			
EVO Dedicated Carpark	5400	3000	1
			1
TOTAL NO. OF CARS			364

MOTOCYCLE SCHEDULE

TYPE	DIMENSIONS LENGTH	DIMENSIONS WIDTH	NUMBER OF SPACES
LOWER GROUND			
MOTORCYCLE PARKING			11
TOTAL NO. OF CARS			11

STORAGE	232

ADAPTABLE UNIT SCHEDULE

TYPE		UNITS
1 BED		3
2 BED		13
3 BED		6
TOTAL		**22**

COMMUNAL OPEAN SPACE

Level	Area
UPPER GROUND	437 m²
LEVEL 1	251 m²
LEVEL 1	187 m²
LEVEL 2	291 m²
Grand total	1166 m²

LANDSCAPE AREA

LEVEL	AREA
LOWER GROUND	14 m²
UPPER GROUND	960 m²
LEVEL 1	164 m²
LEVEL 2	302 m²
LEVEL 3	13 m²
LEVEL 4	13 m²
TOTAL GFA	1466 m²

AREA SCHEDULE - NSA

NAME	AREA
LOWER GROUND	
ADAPTIVE COMMERCIAL	641 m²
	641 m²
UPPER GROUND	
ADAPTIVE COMMERCIAL	718 m²
RETAIL	1087 m²
	1806 m²
LEVEL 1	
2BED	610 m²
3BED	112 m²
	722 m²
LEVEL 2	
1BED	181 m²
2BED	1825 m²
3BED	347 m²
STUDIO	45 m²
	2398 m²
LEVEL 3	
1BED	181 m²
2BED	1825 m²
3BED	348 m²
STUDIO	45 m²
	2399 m²
LEVEL 4	
1BED	181 m²
2BED	1825 m²
3BED	348 m²
STUDIO	45 m²
	2399 m²
LEVEL 5	
1BED	181 m²
2BED	1825 m²
3BED	348 m²
STUDIO	45 m²
	2399 m²
LEVEL 6	
1BED	181 m²
2BED	1825 m²
3BED	348 m²
STUDIO	45 m²
	2399 m²
LEVEL 7	
1BED	181 m²
2BED	1825 m²
3BED	347 m²
STUDIO	45 m²
	2398 m²
LEVEL 8	
3BED ST	1162 m²
4BED ST	702 m²
	1864 m²
LEVEL 9	
3BED ST	1245 m²
4BED ST	746 m²
	1991 m²
TOTAL NLA	21415 m²

GFA EXCLUDES: CARPARK, LANDSCAPE, AND BALCONIES

AREA SCHEDULE - GFA

NAME	AREA
Not Placed	
WASTE	0 m²
	0 m²
BASEMENT 2	
SERVICES	22 m²
	22 m²
BASEMENT 1	
SERVICES	22 m²
	22 m²
LOWER GROUND	
ADAPTIVE COMMERCIAL	641 m²
POS	180 m²
SERVICES	322 m²
	1143 m²
UPPER GROUND	
ADAPTIVE COMMERCIAL	718 m²
AMENITY	49 m²
LIFT / STAIR	100 m²
POS	122 m²
RETAIL	1087 m²
SERVICES	163 m²
WASTE	218 m²
	2458 m²
LEVEL 1	
2BED	610 m²
3BED	112 m²
AMENITY	273 m²
CORRIDOR	264 m²
POS	33 m²
SERVICES	151 m²
	1443 m²
LEVEL 2	
1BED	181 m²
2BED	1825 m²
3BED	347 m²
CORRIDOR	513 m²
POS	110 m²
SERVICES	44 m²
STUDIO	45 m²
	3065 m²
LEVEL 3	
1BED	181 m²
2BED	1825 m²
3BED	348 m²
CORRIDOR	505 m²
POS	110 m²
SERVICES	43 m²
STUDIO	45 m²
	3057 m²
LEVEL 4	
1BED	181 m²
2BED	1825 m²
3BED	348 m²
CORRIDOR	510 m²
POS	110 m²
SERVICES	43 m²
STUDIO	45 m²
	3062 m²
LEVEL 5	
1BED	181 m²
2BED	1825 m²
3BED	348 m²
CORRIDOR	517 m²
POS	110 m²
SERVICES	43 m²
STUDIO	45 m²
	3069 m²
LEVEL 6	
1BED	181 m²
2BED	1825 m²
3BED	348 m²
CORRIDOR	516 m²
POS	110 m²
SERVICES	43 m²
STUDIO	45 m²
	3069 m²
LEVEL 7	

AREA SCHEDULE - GFA

NAME	AREA
1BED	181 m²
2BED	1825 m²
3BED	347 m²
CORRIDOR	517 m²
POS	110 m²
SERVICES	43 m²
STUDIO	45 m²
	3068 m²
LEVEL 8	
3BED ST	1162 m²
4BED ST	702 m²
CORRIDOR	456 m²
SERVICES	43 m²
	2363 m²
LEVEL 9	
3BED ST	1245 m²
4BED ST	746 m²
SERVICES	82 m²
	2073 m²
TOTAL GFA	27914 m²

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Project
Worth Street - Mixed Use

BLOCK 09 SECTION 132
CASEY ACT 2913

Drawing Title
DEVELOPMENT STATISTICS

Scale: @ A1

Date: 21.09.2022

Revision: 3
DA SUBMISSION

Drawing Number: DA-01-02

PLOT STAMP DATE: 23/11/2022 7:59:58 AM

LEGEND: PLANS

FFL X.XXX	PROPOSED FINISHED FLOOR LEVEL (METRES) ABOVE DATUM.
FSL X.XXX	PROPOSED FINISHED SLAB LEVEL (METRES) ABOVE DATUM.
RL X.XXX	PROPOSED REDUCED SPOT LEVEL (METRES) ABOVE DATUM.
ROOM NAME 1-001	ROOM TAG WITH NAME & NUMBER
5000	GENERAL DIMENSIONS (DIAGONAL)
GR 5000 GR	DIMENSIONS TO GRID (DOT)
	SITE BOUNDARY
	ACCESSIBLE PARKING
A	ADAPTABLE UNIT PARKING
	STORAGE CAGES
	DRYING AREA
	AIR CONDITIONING
	COMMUNAL OPEN SPACE

SERVICES LEGEND:

WM	WATER METER
FBBV	FIRE BRIGADE BOOSTER VALVE
SVR	SPRINKLER VALVE ROOM
FIP	FIRE INDICATIVE PANEL
EXH	EXHAUST
LB	LETTERBOX

GENERAL NOTES:

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- HEAD HEIGHT OVER ACCESSIBLE CAR PARKING SPACES TO BE IN ACCORDANCE WITH **AS 2890.6**.
- PASSENGER LIFTS TO **AS 1735.12** AND **BCA E3.6**.
- RESIDENTS PARKING WILL HAVE ACCESS CONTROL VIA OPERABLE GATES.
- ACCESSIBLE PATH OF TRAVEL PROVIDED TO ALL SOLE OCCUPANCY UNITS SERVED BY A LIFT.
- ENTRANCES TO THE BUILDING AND ALL APARTMENTS ALONG THE ACCESSIBLE PATH OF TRAVEL TO COMPLY WITH **AS 1428.1**.
- ALL TACTILE INDICATORS TO **AS 1428.4**.
- ALL FLOOR SURFACES TO BE SLIP RESISTANT BROOM FINISHED.
- HANDRAILS TO **AS 1428.1**.
- STORAGE CAGES TO BE SECURED WITH MIN. AREA OF 1.5m².

UNIT LEGEND:

B	BEDROOM
L	LIVING
D	DINING
K	KITCHEN
BTH	BATHROOM
ENS	ENSUITE
L'DRY	LAUNDRY
ST	STUDY
PR	POWDER ROOM
WIR	WALK-IN ROBE
COMM	COMMERCIAL / OFFICE SPACE
MR	MEDIA ROOM

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Scale 1:300

0 3m 6m 15m 30m

Project
Worth Street - Mixed Use

BLOCK 09 SECTION 132
CASEY ACT 2913

Drawing Title
PN - BASEMENT 2

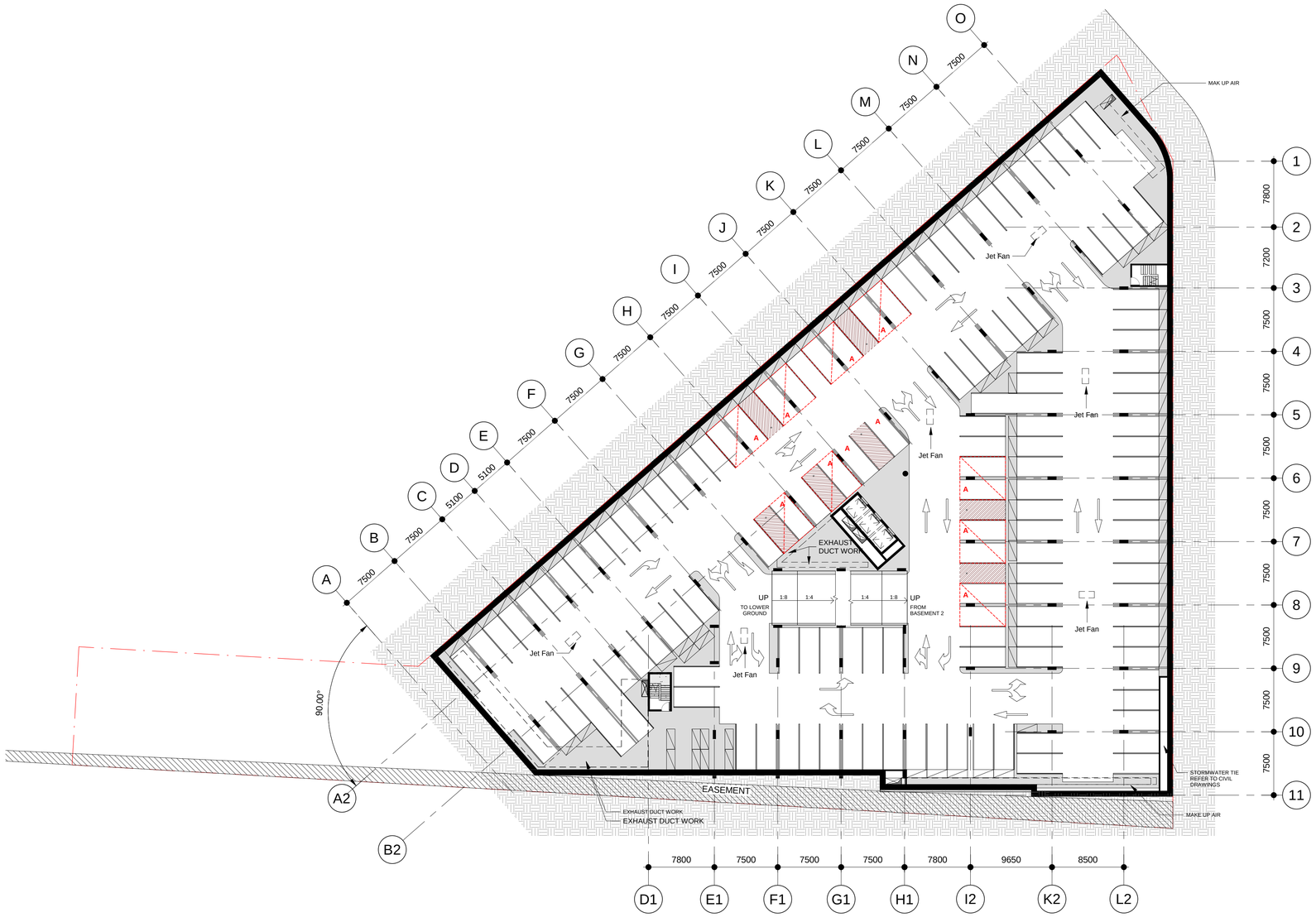
Scale: 1 : 300 @ A1

Date: 21.09.2022

Revision: 2
DA SUBMISSION

Drawing Number: DA-20-01

PLOT STAMP DATE: 11/11/2022 12:12:47 PM



LEGEND: PLANS

FFL X.XXX	PROPOSED FINISHED FLOOR LEVEL (METRES) ABOVE DATUM.
FSL X.XXX	PROPOSED FINISHED SLAB LEVEL (METRES) ABOVE DATUM.
RL X.XXX	PROPOSED REDUCED SPOT LEVEL (METRES) ABOVE DATUM.
ROOM NAME 1-001	ROOM TAG WITH NAME & NUMBER
5000	GENERAL DIMENSIONS (DIAGONAL)
GR 5000 GR	DIMENSIONS TO GRID (DOT)
	SITE BOUNDARY
	ACCESSIBLE PARKING
A	ADAPTABLE UNIT PARKING
	STORAGE CAGES
	DRYING AREA
	AIR CONDITIONING
	COMMUNAL OPEN SPACE

SERVICES LEGEND:

WM	WATER METER
FBBV	FIRE BRIGADE BOOSTER VALVE
SVR	SPRINKLER VALVE ROOM
FIP	FIRE INDICATIVE PANEL
EXH	EXHAUST
LB	LETTERBOX

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UNIT LEGEND:

B	BEDROOM
L	LIVING
D	DINING
K	KITCHEN
BTH	BATHROOM
ENS	ENSUITE
L'DRY	LAUNDRY
ST	STUDY
PR	POWDER ROOM
WIR	WALK-IN ROBE
COMM	COMMERCIAL / OFFICE SPACE
MR	MEDIA ROOM

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Scale 1:300

0 3m 6m 15m 30m

Project
Worth Street - Mixed Use

BLOCK 09 SECTION 132
CASEY ACT 2913

Drawing Title
PN - BASEMENT 1

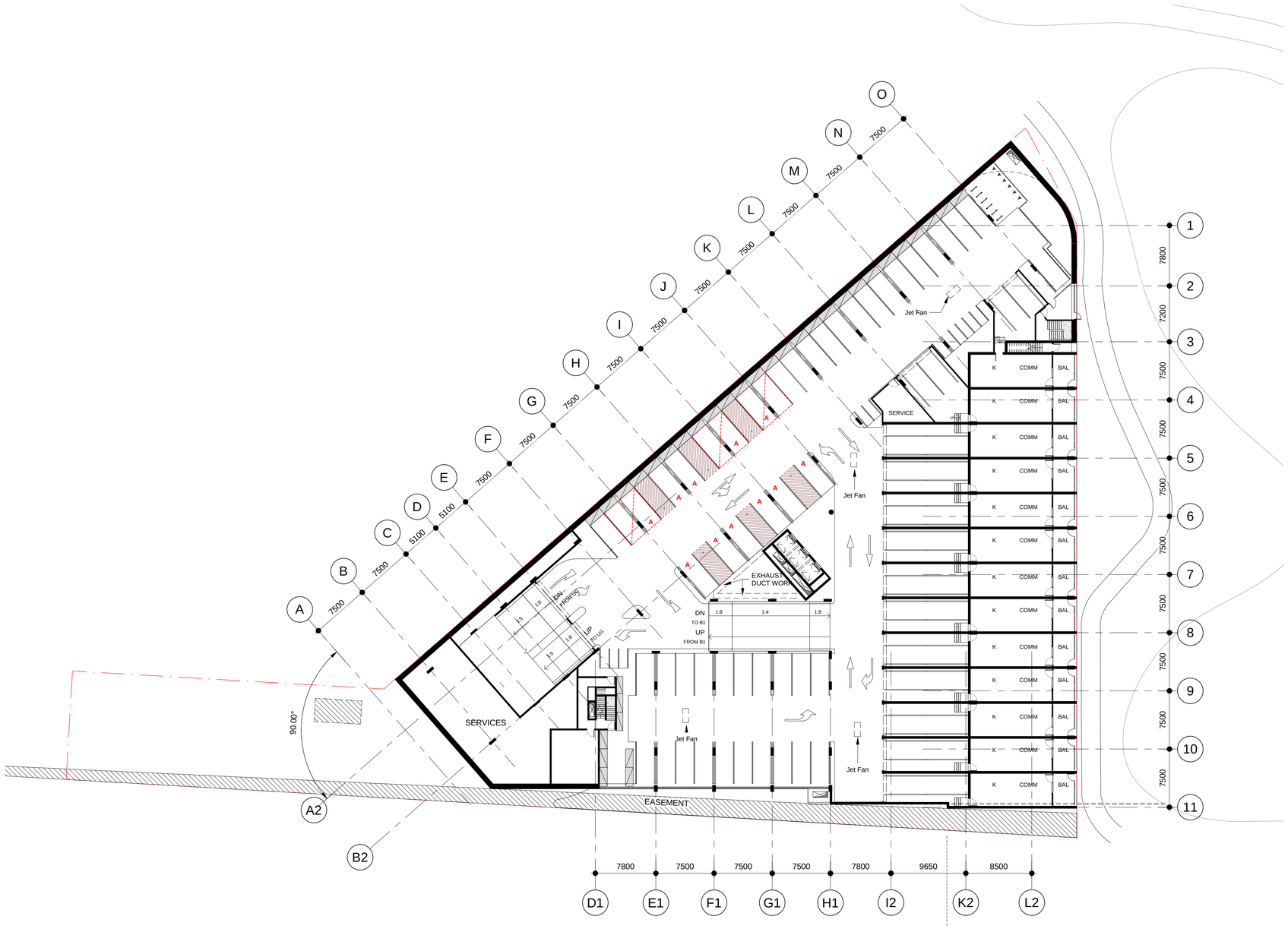
Scale: 1 : 300 @ A1

Date: 21.09.2022

Revision: 2
DA SUBMISSION

Drawing Number: DA-20-02

PLOT STAMP DATE: 11/11/2022 12:13:12 PM



LEGEND: PLANS

FFL X.XXX	PROPOSED FINISHED FLOOR LEVEL (METRES) ABOVE DATUM.
FSL X.XXX	PROPOSED FINISHED SLAB LEVEL (METRES) ABOVE DATUM.
RL X.XXX	PROPOSED REDUCED SPOT LEVEL (METRES) ABOVE DATUM.
ROOM NAME 1-001	ROOM TAG WITH NAME & NUMBER
5000	GENERAL DIMENSIONS (DIAGONAL)
GR 5000 GR	DIMENSIONS TO GRID (DOT)
	SITE BOUNDARY
	ACCESSIBLE PARKING
A	ADAPTABLE UNIT PARKING
	STORAGE CAGES
	DRYING AREA
	AIR CONDITIONING
	COMMUNAL OPEN SPACE

SERVICES LEGEND:

WM	WATER METER
FBBV	FIRE BRIGADE BOOSTER VALVE
SVR	SPRINKLER VALVE ROOM
FIP	FIRE INDICATIVE PANEL
EXH	EXHAUST
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UNIT LEGEND:

B	BEDROOM
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Worth Street - Mixed Use

BLOCK 09 SECTION 132
CASEY ACT 2913

Drawing Title
PN - LOWER GROUND LEVEL

Scale: 1 : 300 @ A1
Date: 21.09.2022
Revision: 2
DA SUBMISSION
Drawing Number: DA-20-03

PLOT STAMP DATE: 22/10/2022 10:13:07 PM

LEGEND: PLANS

FFL X.XXX	PROPOSED FINISHED FLOOR LEVEL (METRES) ABOVE DATUM.
FSL X.XXX	PROPOSED FINISHED SLAB LEVEL (METRES) ABOVE DATUM.
RL X.XXX	PROPOSED REDUCED SPOT LEVEL (METRES) ABOVE DATUM.
ROOM NAME 1-001	ROOM TAG WITH NAME & NUMBER
5000	GENERAL DIMENSIONS (DIAGONAL)
GR 5000 GR	DIMENSIONS TO GRID (DOT)
	SITE BOUNDARY
	ACCESSIBLE PARKING
A	ADAPTABLE UNIT PARKING
	STORAGE CAGES
	DRYING AREA
	AIR CONDITIONING
	COMMUNAL OPEN SPACE

SERVICES LEGEND:

WM	WATER METER
FBBV	FIRE BRIGADE BOOSTER VALVE
SVR	SPRINKLER VALVE ROOM
FIP	FIRE INDICATIVE PANEL
EXH	EXHAUST
LB	LETTERBOX

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UNIT LEGEND:

B	BEDROOM
L	LIVING
D	DINING
K	KITCHEN
BTH	BATHROOM
ENS	ENSUITE
L'DRY	LAUNDRY
ST	STUDY
PR	POWDER ROOM
WIR	WALK-IN ROBE
COMM	COMMERCIAL / OFFICE SPACE
MR	MEDIA ROOM

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Scale 1:300

0 3m 6m 15m 30m

Project
Worth Street - Mixed Use

BLOCK 09 SECTION 132
CASEY ACT 2913

Drawing Title
PN - UPPER GROUND LEVEL

Scale: 1 : 300 @ A1

Date: 21.09.2022

Revision: 2
DA SUBMISSION

Drawing Number: DA-20-04

PLOT STAMP DATE: 22/11/2022 6:01:56 PM

INTERSECTION SUMMARY

Site: 101A [AM Base 2022 Weekday Peak 8:00am - 9:00am (Site Folder: Kingsland Parade and Bentley Place)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

New Site
Site Category: (None)
Roundabout

Intersection Performance - Hourly Values			
Performance Measure	**Vehicles:**	**All MCs**	**Persons**
Travel Speed (Average)	km/h	36.4	36.4 km/h
Travel Distance (Total)	veh-km/h	262.9	315.5 pers-km/h
Travel Time (Total)	veh-h/h	7.2	8.7 pers-h/h
Desired Speed	km/h	40.0	
Speed Efficiency		0.91	
Travel Time Index		9.01	
Congestion Coefficient		1.10	
Demand Flows (Total)	veh/h	651	781 pers/h
Arrival Flows (Total)	veh/h	651	
Percent Heavy Vehicles (Demand)	%	4.5	
Percent Heavy Vehicles (Arrivals)	%	4.5	
Degree of Saturation		0.172	
Practical Spare Capacity	%	395.4	
Effective Intersection Capacity	veh/h	3791	
Control Delay (Total)	veh-h/h	0.47	0.57 pers-h/h
Control Delay (Average)	sec	2.6	2.6 sec
Control Delay (Worst Lane by MC)	sec	5.6	
Control Delay (Worst Movement by MC)	sec	8.1	8.1 sec
Geometric Delay (Average)	sec	2.0	
Stop-Line Delay (Average)	sec	0.6	
Idling Time (Average)	sec	0.0	
Intersection Level of Service (LOS)		LOS A	
95% Back of Queue - Veh (Worst Lane)	veh	0.9	
95% Back of Queue - Dist (Worst Lane)	m	6.4	
Ave. Que Storage Ratio (Worst Lane)		0.03	
Effective Stops (Total)	veh/h	209	250 pers/h
Effective Stop Rate		0.32	0.32
Proportion Queued		0.26	0.26
Performance Index		12.6	12.6
Cost (Total)	$/h	298.19	298.19 $/h
Fuel Consumption (Total)	L/h	26.3	
Carbon Dioxide (Total)	kg/h	62.5	
Hydrocarbons (Total)	kg/h	0.005	
Carbon Monoxide (Total)	kg/h	0.04	
NOx (Total)	kg/h	0.113	

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Intersection LOS value for Vehicles is based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand effects.
In Network analysis, Arrival Flows will be reduced if Upstream Capacity Constraint exists.

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

Site Model Variability Index (Average value of largest changes in Lane Degrees of Saturation from the third to the last Main (Timing-Capacity) Iterations): 0.6 %

Number of Iterations: 3 (Maximum: 10)

Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 100.0% 0.0% 0.6%

Intersection Performance - Annual Values			
Performance Measure	**Vehicles:**	**All MCs**	**Persons**
Demand Flows (Total)	veh/y	312,253	374,703 pers/y
Delay (Total)	veh-h/y	227	273 pers-h/y

Effective Stops (Total)	veh/y	100,165	120,198	pers/y
Travel Distance (Total)	veh-km/y	126,204	151,445	pers-km/y
Travel Time (Total)	veh-h/y	3,465	4,158	pers-h/y
Cost (Total)	$/y	143,132	143,132	$/y
Fuel Consumption (Total)	L/y	12,613		
Carbon Dioxide (Total)	kg/y	30,024		
Hydrocarbons (Total)	kg/y	2		
Carbon Monoxide (Total)	kg/y	19		
NOx (Total)	kg/y	54		

1 Hours per Year: 480 (Site)

INTERSECTION SUMMARY

Site: 101A [AM Development 2023 Weekday Peak 8:00am - 9:00am (Site Folder: Kingsland Parade and Bentley Place)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

New Site
Site Category: (None)
Roundabout

Intersection Performance - Hourly Values				
Performance Measure	**Vehicles:**	**All MCs**	**Persons**	
Travel Speed (Average)	km/h	35.8	35.8	km/h
Travel Distance (Total)	veh-km/h	348.8	418.6	pers-km/h
Travel Time (Total)	veh-h/h	9.7	11.7	pers-h/h
Desired Speed	km/h	40.6		
Speed Efficiency		0.88		
Travel Time Index		8.69		
Congestion Coefficient		1.13		
Demand Flows (Total)	veh/h	883	1060	pers/h
Arrival Flows (Total)	veh/h	883		
Percent Heavy Vehicles (Demand)	%	4.1		
Percent Heavy Vehicles (Arrivals)	%	4.1		
Degree of Saturation		0.275		
Practical Spare Capacity	%	209.4		
Effective Intersection Capacity	veh/h	3214		
Control Delay (Total)	veh-h/h	0.88	1.05	pers-h/h
Control Delay (Average)	sec	3.6	3.6	sec
Control Delay (Worst Lane by MC)	sec	6.3		
Control Delay (Worst Movement by MC)	sec	8.4	8.4	sec
Geometric Delay (Average)	sec	2.5		
Stop-Line Delay (Average)	sec	1.1		
Idling Time (Average)	sec	0.0		
Intersection Level of Service (LOS)		LOS A		
95% Back of Queue - Veh (Worst Lane)	veh	1.4		
95% Back of Queue - Dist (Worst Lane)	m	10.0		
Ave. Que Storage Ratio (Worst Lane)		0.04		
Effective Stops (Total)	veh/h	362	435	pers/h
Effective Stop Rate		0.41	0.41	
Proportion Queued		0.38	0.38	
Performance Index		19.2	19.2	
Cost (Total)	$/h	405.10	405.10	$/h
Fuel Consumption (Total)	L/h	36.6		
Carbon Dioxide (Total)	kg/h	87.1		
Hydrocarbons (Total)	kg/h	0.007		
Carbon Monoxide (Total)	kg/h	0.06		
NOx (Total)	kg/h	0.149		

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Intersection LOS value for Vehicles is based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand effects.
In Network analysis, Arrival Flows will be reduced if Upstream Capacity Constraint exists.

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

Site Model Variability Index (Average value of largest changes in Lane Degrees of Saturation from the third to the last Main (Timing-Capacity) Iterations): 0.8 %

Number of Iterations: 3 (Maximum: 10)

Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 100.0% 0.0% 0.8%

Intersection Performance - Annual Values				
Performance Measure	**Vehicles:**	**All MCs**	**Persons**	
Demand Flows (Total)	veh/y	423,916	508,699	pers/y
Delay (Total)	veh-h/y	422	506	pers-h/y

Effective Stops (Total)	veh/y	173,834	208,600	pers/y
Travel Distance (Total)	veh-km/y	167,430	200,916	pers-km/y
Travel Time (Total)	veh-h/y	4,677	5,612	pers-h/y
Cost (Total)	$/y	194,448	194,448	$/y
Fuel Consumption (Total)	L/y	17,575		
Carbon Dioxide (Total)	kg/y	41,793		
Hydrocarbons (Total)	kg/y	3		
Carbon Monoxide (Total)	kg/y	27		
NOx (Total)	kg/y	71		

1 Hours per Year: 480 (Site)

INTERSECTION SUMMARY

Site: 101A [AM Future 2033 Weekday Peak 8:00am - 9:00am (Site Folder: Kingsland Parade and Bentley Place)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

New Site
Site Category: (None)
Roundabout

Intersection Performance - Hourly Values			
Performance Measure	**Vehicles:**	**All MCs**	**Persons**
Travel Speed (Average)	km/h	35.6	35.6 km/h
Travel Distance (Total)	veh-km/h	391.5	469.8 pers-km/h
Travel Time (Total)	veh-h/h	11.0	13.2 pers-h/h
Desired Speed	km/h	40.5	
Speed Efficiency		0.88	
Travel Time Index		8.65	
Congestion Coefficient		1.14	
Demand Flows (Total)	veh/h	979	1175 pers/h
Arrival Flows (Total)	veh/h	979	
Percent Heavy Vehicles (Demand)	%	3.9	
Percent Heavy Vehicles (Arrivals)	%	3.9	
Degree of Saturation		0.314	
Practical Spare Capacity	%	171.0	
Effective Intersection Capacity	veh/h	3121	
Control Delay (Total)	veh-h/h	1.04	1.25 pers-h/h
Control Delay (Average)	sec	3.8	3.8 sec
Control Delay (Worst Lane by MC)	sec	6.5	
Control Delay (Worst Movement by MC)	sec	9.1	9.1 sec
Geometric Delay (Average)	sec	2.6	
Stop-Line Delay (Average)	sec	1.3	
Idling Time (Average)	sec	0.0	
Intersection Level of Service (LOS)		LOS A	
95% Back of Queue - Veh (Worst Lane)	veh	1.7	
95% Back of Queue - Dist (Worst Lane)	m	12.0	
Ave. Que Storage Ratio (Worst Lane)		0.05	
Effective Stops (Total)	veh/h	421	506 pers/h
Effective Stop Rate		0.43	0.43
Proportion Queued		0.42	0.42
Performance Index		22.2	22.2
Cost (Total)	$/h	456.73	456.73 $/h
Fuel Consumption (Total)	L/h	41.1	
Carbon Dioxide (Total)	kg/h	97.6	
Hydrocarbons (Total)	kg/h	0.008	
Carbon Monoxide (Total)	kg/h	0.06	
NOx (Total)	kg/h	0.160	

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Intersection LOS value for Vehicles is based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand effects.
In Network analysis, Arrival Flows will be reduced if Upstream Capacity Constraint exists.

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

Site Model Variability Index (Average value of largest changes in Lane Degrees of Saturation from the third to the last Main (Timing-Capacity) Iterations): 0.8 %

Number of Iterations: 4 (Maximum: 10)

Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 0.0% 1.1% 0.6%

Intersection Performance - Annual Values			
Performance Measure	**Vehicles:**	**All MCs**	**Persons**
Demand Flows (Total)	veh/y	469,895	563,874 pers/y
Delay (Total)	veh-h/y	500	600 pers-h/y

Effective Stops (Total)	veh/y	202,265	242,718	pers/y
Travel Distance (Total)	veh-km/y	187,937	225,525	pers-km/y
Travel Time (Total)	veh-h/y	5,280	6,336	pers-h/y
Cost (Total)	$/y	219,229	219,229	$/y
Fuel Consumption (Total)	L/y	19,718		
Carbon Dioxide (Total)	kg/y	46,844		
Hydrocarbons (Total)	kg/y	4		
Carbon Monoxide (Total)	kg/y	31		
NOx (Total)	kg/y	77		

1 Hours per Year: 480 (Site)

INTERSECTION SUMMARY

Site: 101B [PM Base 2022 Weekday Peak 5:15pm - 6:15pm (Site Folder: Kingsland Parade and Bentley Place)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

New Site
Site Category: (None)
Roundabout

Intersection Performance - Hourly Values			
Performance Measure	**Vehicles:**	**All MCs**	**Persons**
Travel Speed (Average)	km/h	36.2	36.2 km/h
Travel Distance (Total)	veh-km/h	394.5	473.4 pers-km/h
Travel Time (Total)	veh-h/h	10.9	13.1 pers-h/h
Desired Speed	km/h	40.0	
Speed Efficiency		0.90	
Travel Time Index		8.94	
Congestion Coefficient		1.11	
Demand Flows (Total)	veh/h	1000	1200 pers/h
Arrival Flows (Total)	veh/h	1000	
Percent Heavy Vehicles (Demand)	%	2.0	
Percent Heavy Vehicles (Arrivals)	%	2.0	
Degree of Saturation		0.353	
Practical Spare Capacity	%	140.6	
Effective Intersection Capacity	veh/h	2831	
Control Delay (Total)	veh-h/h	0.74	0.89 pers-h/h
Control Delay (Average)	sec	2.7	2.7 sec
Control Delay (Worst Lane by MC)	sec	6.2	
Control Delay (Worst Movement by MC)	sec	8.4	8.4 sec
Geometric Delay (Average)	sec	1.9	
Stop-Line Delay (Average)	sec	0.8	
Idling Time (Average)	sec	0.0	
Intersection Level of Service (LOS)		LOS A	
95% Back of Queue - Veh (Worst Lane)	veh	2.2	
95% Back of Queue - Dist (Worst Lane)	m	15.5	
Ave. Que Storage Ratio (Worst Lane)		0.09	
Effective Stops (Total)	veh/h	338	405 pers/h
Effective Stop Rate		0.34	0.34
Proportion Queued		0.31	0.31
Performance Index		21.4	21.4
Cost (Total)	$/h	441.24	441.24 $/h
Fuel Consumption (Total)	L/h	35.7	
Carbon Dioxide (Total)	kg/h	84.3	
Hydrocarbons (Total)	kg/h	0.006	
Carbon Monoxide (Total)	kg/h	0.05	
NOx (Total)	kg/h	0.089	

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Intersection LOS value for Vehicles is based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand effects.
In Network analysis, Arrival Flows will be reduced if Upstream Capacity Constraint exists.

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

Site Model Variability Index (Average value of largest changes in Lane Degrees of Saturation from the third to the last Main (Timing-Capacity) Iterations): 1.2 %

Number of Iterations: 4 (Maximum: 10)

Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 0.0% 1.5% 0.9%

Intersection Performance - Annual Values			
Performance Measure	**Vehicles:**	**All MCs**	**Persons**
Demand Flows (Total)	veh/y	480,000	576,000 pers/y
Delay (Total)	veh-h/y	356	428 pers-h/y

Effective Stops (Total)	veh/y	162,085	194,502	pers/y
Travel Distance (Total)	veh-km/y	189,350	227,220	pers-km/y
Travel Time (Total)	veh-h/y	5,232	6,278	pers-h/y
Cost (Total)	$/y	211,797	211,797	$/y
Fuel Consumption (Total)	L/y	17,120		
Carbon Dioxide (Total)	kg/y	40,472		
Hydrocarbons (Total)	kg/y	3		
Carbon Monoxide (Total)	kg/y	23		
NOx (Total)	kg/y	43		

1 Hours per Year: 480 (Site)

INTERSECTION SUMMARY

Site: 101B [PM Development 2023 Weekday Peak 5:15pm - 6:15pm (Site Folder: Kingsland Parade and Bentley Place)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

New Site
Site Category: (None)
Roundabout

Intersection Performance - Hourly Values			
Performance Measure	**Vehicles:**	**All MCs**	**Persons**
Travel Speed (Average)	km/h	35.1	35.1 km/h
Travel Distance (Total)	veh-km/h	465.8	558.9 pers-km/h
Travel Time (Total)	veh-h/h	13.3	15.9 pers-h/h
Desired Speed	km/h	40.0	
Speed Efficiency		0.88	
Travel Time Index		8.63	
Congestion Coefficient		1.14	
Demand Flows (Total)	veh/h	1242	1491 pers/h
Arrival Flows (Total)	veh/h	1242	
Percent Heavy Vehicles (Demand)	%	2.1	
Percent Heavy Vehicles (Arrivals)	%	2.1	
Degree of Saturation		0.475	
Practical Spare Capacity	%	78.8	
Effective Intersection Capacity	veh/h	2613	
Control Delay (Total)	veh-h/h	1.22	1.46 pers-h/h
Control Delay (Average)	sec	3.5	3.5 sec
Control Delay (Worst Lane by MC)	sec	7.3	
Control Delay (Worst Movement by MC)	sec	9.8	9.8 sec
Geometric Delay (Average)	sec	2.3	
Stop-Line Delay (Average)	sec	1.2	
Idling Time (Average)	sec	0.1	
Intersection Level of Service (LOS)		LOS A	
95% Back of Queue - Veh (Worst Lane)	veh	3.4	
95% Back of Queue - Dist (Worst Lane)	m	24.3	
Ave. Que Storage Ratio (Worst Lane)		0.14	
Effective Stops (Total)	veh/h	518	621 pers/h
Effective Stop Rate		0.42	0.42
Proportion Queued		0.43	0.43
Performance Index		29.1	29.1
Cost (Total)	$/h	542.10	542.10 $/h
Fuel Consumption (Total)	L/h	45.4	
Carbon Dioxide (Total)	kg/h	107.3	
Hydrocarbons (Total)	kg/h	0.008	
Carbon Monoxide (Total)	kg/h	0.06	
NOx (Total)	kg/h	0.123	

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Intersection LOS value for Vehicles is based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand effects.
In Network analysis, Arrival Flows will be reduced if Upstream Capacity Constraint exists.

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

Site Model Variability Index (Average value of largest changes in Lane Degrees of Saturation from the third to the last Main (Timing-Capacity) Iterations): 2.0 %

Number of Iterations: 5 (Maximum: 10)

Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 3.1% 1.9% 1.0%

Intersection Performance - Annual Values			
Performance Measure	**Vehicles:**	**All MCs**	**Persons**
Demand Flows (Total)	veh/y	596,211	715,453 pers/y
Delay (Total)	veh-h/y	584	701 pers-h/y

Effective Stops (Total)	veh/y	248,540	298,248	pers/y
Travel Distance (Total)	veh-km/y	223,577	268,292	pers-km/y
Travel Time (Total)	veh-h/y	6,378	7,653	pers-h/y
Cost (Total)	$/y	260,210	260,210	$/y
Fuel Consumption (Total)	L/y	21,772		
Carbon Dioxide (Total)	kg/y	51,483		
Hydrocarbons (Total)	kg/y	4		
Carbon Monoxide (Total)	kg/y	31		
NOx (Total)	kg/y	59		

1 Hours per Year: 480 (Site)

INTERSECTION SUMMARY

Site: 101B [PM Future 2033 Weekday Peak 5:15pm - 6:15pm (Site Folder: Kingsland Parade and Bentley Place)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

New Site
Site Category: (None)
Roundabout

Intersection Performance - Hourly Values				
Performance Measure	**Vehicles:**	**All MCs**	**Persons**	
Travel Speed (Average)	km/h	34.4	34.4	km/h
Travel Distance (Total)	veh-km/h	580.1	696.1	pers-km/h
Travel Time (Total)	veh-h/h	16.9	20.2	pers-h/h
Desired Speed	km/h	40.0		
Speed Efficiency		0.86		
Travel Time Index		8.45		
Congestion Coefficient		1.16		
Demand Flows (Total)	veh/h	1536	1843	pers/h
Arrival Flows (Total)	veh/h	1536		
Percent Heavy Vehicles (Demand)	%	6.6		
Percent Heavy Vehicles (Arrivals)	%	6.6		
Degree of Saturation		0.649		
Practical Spare Capacity	%	31.0		
Effective Intersection Capacity	veh/h	2366		
Control Delay (Total)	veh-h/h	1.74	2.09	pers-h/h
Control Delay (Average)	sec	4.1	4.1	sec
Control Delay (Worst Lane by MC)	sec	9.0		
Control Delay (Worst Movement by MC)	sec	11.5	11.5	sec
Geometric Delay (Average)	sec	2.3		
Stop-Line Delay (Average)	sec	1.7		
Idling Time (Average)	sec	0.2		
Intersection Level of Service (LOS)		LOS A		
95% Back of Queue - Veh (Worst Lane)	veh	6.1		
95% Back of Queue - Dist (Worst Lane)	m	46.2		
Ave. Que Storage Ratio (Worst Lane)		0.27		
Effective Stops (Total)	veh/h	717	861	pers/h
Effective Stop Rate		0.47	0.47	
Proportion Queued		0.55	0.55	
Performance Index		43.8	43.8	
Cost (Total)	$/h	713.84	713.84	$/h
Fuel Consumption (Total)	L/h	69.1		
Carbon Dioxide (Total)	kg/h	165.5		
Hydrocarbons (Total)	kg/h	0.013		
Carbon Monoxide (Total)	kg/h	0.11		
NOx (Total)	kg/h	0.421		

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Intersection LOS value for Vehicles is based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand effects.
In Network analysis, Arrival Flows will be reduced if Upstream Capacity Constraint exists.

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

Site Model Variability Index (Average value of largest changes in Lane Degrees of Saturation from the third to the last Main (Timing-Capacity) Iterations): 2.7 %

Number of Iterations: 7 (Maximum: 10)

Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 2.1% 1.1% 0.6%

Intersection Performance - Annual Values				
Performance Measure	**Vehicles:**	**All MCs**	**Persons**	
Demand Flows (Total)	veh/y	737,179	884,615	pers/y
Delay (Total)	veh-h/y	834	1,001	pers-h/y

Effective Stops (Total)	veh/y	344,251	413,101	pers/y
Travel Distance (Total)	veh-km/y	278,432	334,119	pers-km/y
Travel Time (Total)	veh-h/y	8,092	9,711	pers-h/y
Cost (Total)	$/y	342,642	342,642	$/y
Fuel Consumption (Total)	L/y	33,166		
Carbon Dioxide (Total)	kg/y	79,449		
Hydrocarbons (Total)	kg/y	6		
Carbon Monoxide (Total)	kg/y	54		
NOx (Total)	kg/y	202		

1 Hours per Year: 480 (Site)

MOVEMENT SUMMARY

Site: 101A [AM Base 2022 Weekday Peak 8:00am - 9:00am (Site Folder: Kingsland Parade and Bentley Place)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival 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	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Kingsland Parade															
1	L2	All MCs	32	13.3	32	13.3	0.153	2.0	LOS A	0.8	5.6	0.17	0.24	0.17	37.7
2	T1	All MCs	165	5.1	165	5.1	0.153	1.4	LOS A	0.8	5.6	0.17	0.24	0.17	37.4
3	R2	All MCs	12	0.0	12	0.0	0.153	5.7	LOS A	0.8	5.6	0.17	0.24	0.17	33.6
Approach			208	6.1	208	6.1	0.153	1.7	LOS A	0.8	5.6	0.17	0.24	0.17	37.3
East: Bentley Place															
4	L2	All MCs	97	2.2	97	2.2	0.117	2.9	LOS A	0.5	3.7	0.38	0.45	0.38	31.7
5	T1	All MCs	13	0.0	13	0.0	0.117	2.3	LOS A	0.5	3.7	0.38	0.45	0.38	37.0
6	R2	All MCs	20	5.3	20	5.3	0.117	6.7	LOS A	0.5	3.7	0.38	0.45	0.38	35.5
Approach			129	2.4	129	2.4	0.117	3.4	LOS A	0.5	3.7	0.38	0.45	0.38	33.6
North: Kingsland Parade															
8	T1	All MCs	209	4.5	209	4.5	0.172	1.5	LOS A	0.9	6.4	0.22	0.24	0.22	37.1
9	R2	All MCs	11	0.0	11	0.0	0.172	5.8	LOS A	0.9	6.4	0.22	0.24	0.22	38.0
9u	U	All MCs	4	100.0	4	100.0	0.172	8.1	LOS A	0.9	6.4	0.22	0.24	0.22	37.2
Approach			224	6.1	224	6.1	0.172	1.8	LOS A	0.9	6.4	0.22	0.24	0.22	37.1
West: Dalkin Crescent															
10	L2	All MCs	25	0.0	25	0.0	0.080	2.8	LOS A	0.4	3.1	0.40	0.52	0.40	36.6
12	R2	All MCs	63	0.0	63	0.0	0.080	6.7	LOS A	0.4	3.1	0.40	0.52	0.40	35.1
Approach			88	0.0	88	0.0	0.080	5.6	LOS A	0.4	3.1	0.40	0.52	0.40	35.7
All Vehicles			651	4.5	651	4.5	0.172	2.6	LOS A	0.9	6.4	0.26	0.32	0.26	36.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 101A [AM Development 2023 Weekday Peak 8:00am - 9:00am (Site Folder: Kingsland Parade and Bentley Place)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival 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	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Kingsland Parade															
1	L2	All MCs	34	15.6	34	15.6	0.196	2.7	LOS A	1.0	7.7	0.35	0.34	0.35	36.9
2	T1	All MCs	169	5.6	169	5.6	0.196	2.0	LOS A	1.0	7.7	0.35	0.34	0.35	36.3
3	R2	All MCs	23	0.0	23	0.0	0.196	6.3	LOS A	1.0	7.7	0.35	0.34	0.35	31.9
Approach			226	6.5	226	6.5	0.196	2.5	LOS A	1.0	7.7	0.35	0.34	0.35	36.2
East: Bentley Place															
4	L2	All MCs	158	1.3	158	1.3	0.275	3.1	LOS A	1.4	10.0	0.44	0.52	0.44	30.4
5	T1	All MCs	24	0.0	24	0.0	0.275	2.6	LOS A	1.4	10.0	0.44	0.52	0.44	36.3
6	R2	All MCs	121	2.6	121	2.6	0.275	6.9	LOS A	1.4	10.0	0.44	0.52	0.44	34.7
Approach			303	1.7	303	1.7	0.275	4.6	LOS A	1.4	10.0	0.44	0.52	0.44	33.4
North: Kingsland Parade															
7	L2	All MCs	21	0.0	21	0.0	0.198	4.3	LOS A	1.0	7.7	0.26	0.28	0.26	38.7
8	T1	All MCs	215	4.9	215	4.9	0.198	1.6	LOS A	1.0	7.7	0.26	0.28	0.26	37.4
9	R2	All MCs	11	0.0	11	0.0	0.198	5.9	LOS A	1.0	7.7	0.26	0.28	0.26	38.2
9u	U	All MCs	5	100.0	5	100.0	0.198	8.4	LOS A	1.0	7.7	0.26	0.28	0.26	37.4
Approach			252	6.3	252	6.3	0.198	2.2	LOS A	1.0	7.7	0.26	0.28	0.26	37.6
West: Dalkin Crescent															
10	L2	All MCs	26	0.0	26	0.0	0.102	3.6	LOS A	0.6	4.1	0.51	0.57	0.51	37.1
11	T1	All MCs	11	0.0	11	0.0	0.102	6.0	LOS A	0.6	4.1	0.51	0.57	0.51	37.4
12	R2	All MCs	65	0.0	65	0.0	0.102	7.5	LOS A	0.6	4.1	0.51	0.57	0.51	35.7
Approach			102	0.0	102	0.0	0.102	6.3	LOS A	0.6	4.1	0.51	0.57	0.51	36.3
All Vehicles			883	4.1	883	4.1	0.275	3.6	LOS A	1.4	10.0	0.38	0.41	0.38	35.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 101A [AM Future 2033 Weekday Peak 8:00am - 9:00am (Site Folder: Kingsland Parade and Bentley Place)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival 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	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Kingsland Parade															
1	L2	All MCs	34	15.6	34	15.6	0.203	2.8	LOS A	1.1	8.1	0.39	0.36	0.39	36.7
2	T1	All MCs	169	5.6	169	5.6	0.203	2.2	LOS A	1.1	8.1	0.39	0.36	0.39	36.1
3	R2	All MCs	23	0.0	23	0.0	0.203	6.4	LOS A	1.1	8.1	0.39	0.36	0.39	31.7
Approach			226	6.5	226	6.5	0.203	2.7	LOS A	1.1	8.1	0.39	0.36	0.39	36.0
East: Bentley Place															
4	L2	All MCs	162	1.3	162	1.3	0.314	3.5	LOS A	1.7	12.0	0.51	0.55	0.51	30.0
5	T1	All MCs	26	0.0	26	0.0	0.314	3.0	LOS A	1.7	12.0	0.51	0.55	0.51	36.0
6	R2	All MCs	142	2.2	142	2.2	0.314	7.3	LOS A	1.7	12.0	0.51	0.55	0.51	34.4
Approach			331	1.6	331	1.6	0.314	5.1	LOS A	1.7	12.0	0.51	0.55	0.51	33.2
North: Kingsland Parade															
7	L2	All MCs	21	0.0	21	0.0	0.240	4.4	LOS A	1.3	9.8	0.30	0.29	0.30	38.5
8	T1	All MCs	262	4.8	262	4.8	0.240	1.7	LOS A	1.3	9.8	0.30	0.29	0.30	37.1
9	R2	All MCs	13	0.0	13	0.0	0.240	6.0	LOS A	1.3	9.8	0.30	0.29	0.30	38.0
9u	U	All MCs	5	100.0	5	100.0	0.240	8.6	LOS A	1.3	9.8	0.30	0.29	0.30	37.3
Approach			301	5.9	301	5.9	0.240	2.2	LOS A	1.3	9.8	0.30	0.29	0.30	37.3
West: Dalkin Crescent															
10	L2	All MCs	32	0.0	32	0.0	0.124	3.8	LOS A	0.7	5.0	0.54	0.58	0.54	36.9
11	T1	All MCs	11	0.0	11	0.0	0.124	6.2	LOS A	0.7	5.0	0.54	0.58	0.54	37.2
12	R2	All MCs	79	0.0	79	0.0	0.124	7.6	LOS A	0.7	5.0	0.54	0.58	0.54	35.5
Approach			121	0.0	121	0.0	0.124	6.5	LOS A	0.7	5.0	0.54	0.58	0.54	36.1
All Vehicles			979	3.9	979	3.9	0.314	3.8	LOS A	1.7	12.0	0.42	0.43	0.42	35.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 101B [PM Base 2022 Weekday Peak 5:15pm - 6:15pm (Site Folder: Kingsland Parade and Bentley Place)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival 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	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Kingsland Parade															
1	L2	All MCs	55	0.0	55	0.0	0.353	2.2	LOS A	2.2	15.5	0.29	0.29	0.29	37.2
2	T1	All MCs	382	1.7	382	1.7	0.353	1.7	LOS A	2.2	15.5	0.29	0.29	0.29	36.7
3	R2	All MCs	40	2.6	40	2.6	0.353	6.0	LOS A	2.2	15.5	0.29	0.29	0.29	32.3
Approach			477	1.5	477	1.5	0.353	2.1	LOS A	2.2	15.5	0.29	0.29	0.29	36.5
East: Bentley Place															
4	L2	All MCs	152	0.7	152	0.7	0.190	2.9	LOS A	0.9	6.3	0.39	0.45	0.39	31.6
5	T1	All MCs	23	0.0	23	0.0	0.190	2.3	LOS A	0.9	6.3	0.39	0.45	0.39	36.9
6	R2	All MCs	39	2.7	39	2.7	0.190	6.7	LOS A	0.9	6.3	0.39	0.45	0.39	35.4
Approach			214	1.0	214	1.0	0.190	3.5	LOS A	0.9	6.3	0.39	0.45	0.39	33.7
North: Kingsland Parade															
7	L2	All MCs	2	0.0	2	0.0	0.183	2.0	LOS A	0.9	6.7	0.21	0.27	0.21	36.9
8	T1	All MCs	209	3.0	209	3.0	0.183	1.5	LOS A	0.9	6.7	0.21	0.27	0.21	37.0
9	R2	All MCs	23	0.0	23	0.0	0.183	5.8	LOS A	0.9	6.7	0.21	0.27	0.21	37.9
9u	U	All MCs	8	50.0	8	50.0	0.183	7.7	LOS A	0.9	6.7	0.21	0.27	0.21	37.3
Approach			243	4.3	243	4.3	0.183	2.1	LOS A	0.9	6.7	0.21	0.27	0.21	37.1
West: Dalkin Crescent															
10	L2	All MCs	36	0.0	36	0.0	0.076	4.5	LOS A	0.4	3.1	0.60	0.59	0.60	36.4
11	T1	All MCs	2	0.0	2	0.0	0.076	4.1	LOS A	0.4	3.1	0.60	0.59	0.60	35.4
12	R2	All MCs	28	0.0	28	0.0	0.076	8.4	LOS A	0.4	3.1	0.60	0.59	0.60	34.9
Approach			66	0.0	66	0.0	0.076	6.2	LOS A	0.4	3.1	0.60	0.59	0.60	35.9
All Vehicles			1000	2.0	1000	2.0	0.353	2.7	LOS A	2.2	15.5	0.31	0.34	0.31	36.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 101B [PM Development 2023 Weekday Peak 5:15pm - 6:15pm (Site Folder: Kingsland Parade and Bentley Place)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival 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	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Kingsland Parade															
1	L2	All MCs	57	0.0	57	0.0	0.475	2.5	LOS A	3.4	24.3	0.39	0.38	0.39	36.4
2	T1	All MCs	392	1.9	392	1.9	0.475	2.0	LOS A	3.4	24.3	0.39	0.38	0.39	35.7
3	R2	All MCs	178	1.2	178	1.2	0.475	6.3	LOS A	3.4	24.3	0.39	0.38	0.39	30.9
Approach			626	1.5	626	1.5	0.475	3.2	LOS A	3.4	24.3	0.39	0.38	0.39	34.9
East: Bentley Place															
4	L2	All MCs	176	1.2	176	1.2	0.239	3.0	LOS A	1.2	8.7	0.44	0.47	0.44	31.3
5	T1	All MCs	35	0.0	35	0.0	0.239	2.4	LOS A	1.2	8.7	0.44	0.47	0.44	36.7
6	R2	All MCs	52	4.1	52	4.1	0.239	6.8	LOS A	1.2	8.7	0.44	0.47	0.44	35.2
Approach			262	1.6	262	1.6	0.239	3.7	LOS A	1.2	8.7	0.44	0.47	0.44	33.7
North: Kingsland Parade															
7	L2	All MCs	24	0.0	24	0.0	0.246	2.8	LOS A	1.3	9.6	0.41	0.38	0.41	36.0
8	T1	All MCs	215	3.4	215	3.4	0.246	2.3	LOS A	1.3	9.6	0.41	0.38	0.41	36.0
9	R2	All MCs	24	0.0	24	0.0	0.246	6.6	LOS A	1.3	9.6	0.41	0.38	0.41	37.4
9u	U	All MCs	11	50.0	11	50.0	0.246	8.9	LOS A	1.3	9.6	0.41	0.38	0.41	36.7
Approach			274	4.6	274	4.6	0.246	3.0	LOS A	1.3	9.6	0.41	0.38	0.41	36.2
West: Dalkin Crescent															
10	L2	All MCs	37	0.0	37	0.0	0.108	6.0	LOS A	0.7	4.7	0.71	0.65	0.71	35.9
11	T1	All MCs	14	0.0	14	0.0	0.108	5.5	LOS A	0.7	4.7	0.71	0.65	0.71	34.7
12	R2	All MCs	29	0.0	29	0.0	0.108	9.8	LOS A	0.7	4.7	0.71	0.65	0.71	34.2
Approach			80	0.0	80	0.0	0.108	7.3	LOS A	0.7	4.7	0.71	0.65	0.71	35.2
All Vehicles			1242	2.1	1242	2.1	0.475	3.5	LOS A	3.4	24.3	0.43	0.42	0.43	35.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 101B [PM Future 2033 Weekday Peak 5:15pm - 6:15pm (Site Folder: Kingsland Parade and Bentley Place)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival 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	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Kingsland Parade															
1	L2	All MCs	114	39.8	114	39.8	0.649	3.5	LOS A	6.1	46.2	0.55	0.43	0.55	35.8
2	T1	All MCs	471	0.7	471	0.7	0.649	2.4	LOS A	6.1	46.2	0.55	0.43	0.55	35.1
3	R2	All MCs	221	16.2	221	16.2	0.649	7.0	LOS A	6.1	46.2	0.55	0.43	0.55	28.9
Approach			805	10.5	805	10.5	0.649	3.8	LOS A	6.1	46.2	0.55	0.43	0.55	34.1
East: Bentley Place															
4	L2	All MCs	211	1.0	211	1.0	0.297	3.4	LOS A	1.6	11.6	0.51	0.51	0.51	30.8
5	T1	All MCs	40	0.0	40	0.0	0.297	2.8	LOS A	1.6	11.6	0.51	0.51	0.51	36.5
6	R2	All MCs	60	3.5	60	3.5	0.297	7.2	LOS A	1.6	11.6	0.51	0.51	0.51	35.0
Approach			311	1.4	311	1.4	0.297	4.0	LOS A	1.6	11.6	0.51	0.51	0.51	33.3
North: Kingsland Parade															
7	L2	All MCs	24	0.0	24	0.0	0.312	3.2	LOS A	1.8	13.2	0.51	0.44	0.51	35.5
8	T1	All MCs	261	3.2	261	3.2	0.312	2.8	LOS A	1.8	13.2	0.51	0.44	0.51	35.5
9	R2	All MCs	29	0.0	29	0.0	0.312	7.0	LOS A	1.8	13.2	0.51	0.44	0.51	37.1
9u	U	All MCs	11	50.0	11	50.0	0.312	9.6	LOS A	1.8	13.2	0.51	0.44	0.51	36.4
Approach			325	4.2	325	4.2	0.312	3.4	LOS A	1.8	13.2	0.51	0.44	0.51	35.8
West: Dalkin Crescent															
10	L2	All MCs	45	0.0	45	0.0	0.156	7.6	LOS A	1.0	7.2	0.82	0.72	0.82	35.1
11	T1	All MCs	14	0.0	14	0.0	0.156	7.2	LOS A	1.0	7.2	0.82	0.72	0.82	33.7
12	R2	All MCs	36	0.0	36	0.0	0.156	11.5	LOS A	1.0	7.2	0.82	0.72	0.82	33.1
Approach			95	0.0	95	0.0	0.156	9.0	LOS A	1.0	7.2	0.82	0.72	0.82	34.3
All Vehicles			1536	6.6	1536	6.6	0.649	4.1	LOS A	6.1	46.2	0.55	0.47	0.55	34.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

INTERSECTION SUMMARY

Site: 101C [AM Base 2022 Weekday Peak 8:00am - 9:00am (Site Folder: Kingsland Parade and Clarrie Hermes Drive)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

NA
Site Category: (None)
Roundabout

Intersection Performance - Hourly Values			
Performance Measure	**Vehicles:**	**All MCs**	**Persons**
Travel Speed (Average)	km/h	53.3	53.3 km/h
Travel Distance (Total)	veh-km/h	1098.7	1318.4 pers-km/h
Travel Time (Total)	veh-h/h	20.6	24.7 pers-h/h
Desired Speed	km/h	70.4	
Speed Efficiency		0.76	
Travel Time Index		7.31	
Congestion Coefficient		1.32	
Demand Flows (Total)	veh/h	1788	2146 pers/h
Arrival Flows (Total)	veh/h	1788	
Percent Heavy Vehicles (Demand)	%	5.3	
Percent Heavy Vehicles (Arrivals)	%	5.3	
Degree of Saturation		0.513	
Practical Spare Capacity	%	65.6	
Effective Intersection Capacity	veh/h	3484	
Control Delay (Total)	veh-h/h	2.91	3.49 pers-h/h
Control Delay (Average)	sec	5.8	5.8 sec
Control Delay (Worst Lane by MC)	sec	9.2	
Control Delay (Worst Movement by MC)	sec	16.4	16.4 sec
Geometric Delay (Average)	sec	4.8	
Stop-Line Delay (Average)	sec	1.0	
Idling Time (Average)	sec	0.0	
Intersection Level of Service (LOS)		LOS A	
95% Back of Queue - Veh (Worst Lane)	veh	3.9	
95% Back of Queue - Dist (Worst Lane)	m	28.8	
Ave. Que Storage Ratio (Worst Lane)		0.08	
Effective Stops (Total)	veh/h	869	1042 pers/h
Effective Stop Rate		0.49	0.49
Proportion Queued		0.43	0.43
Performance Index		42.7	42.7
Cost (Total)	$/h	1099.27	1099.27 $/h
Fuel Consumption (Total)	L/h	143.5	
Carbon Dioxide (Total)	kg/h	341.1	
Hydrocarbons (Total)	kg/h	0.033	
Carbon Monoxide (Total)	kg/h	0.46	
NOx (Total)	kg/h	0.738	

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Intersection LOS value for Vehicles is based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand effects.
In Network analysis, Arrival Flows will be reduced if Upstream Capacity Constraint exists.

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

Site Model Variability Index (Average value of largest changes in Lane Degrees of Saturation from the third to the last Main (Timing-Capacity) Iterations): 2.3 %

Number of Iterations: 7 (Maximum: 10)

Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 1.9% 1.0% 0.5%

Intersection Performance - Annual Values			
Performance Measure	**Vehicles:**	**All MCs**	**Persons**
Demand Flows (Total)	veh/y	858,442	1,030,131 pers/y
Delay (Total)	veh-h/y	1,395	1,673 pers-h/y

Effective Stops (Total)	veh/y	416,902	500,283	pers/y
Travel Distance (Total)	veh-km/y	527,355	632,826	pers-km/y
Travel Time (Total)	veh-h/y	9,887	11,864	pers-h/y
Cost (Total)	$/y	527,649	527,649	$/y
Fuel Consumption (Total)	L/y	68,877		
Carbon Dioxide (Total)	kg/y	163,739		
Hydrocarbons (Total)	kg/y	16		
Carbon Monoxide (Total)	kg/y	220		
NOx (Total)	kg/y	354		

1 Hours per Year: 480 (Site)

INTERSECTION SUMMARY

Site: 101C [AM Development 2023 Weekday Peak 8:00am - 9:00am (Site Folder: Kingsland Parade and Clarrie Hermes Drive)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

NA
Site Category: (None)
Roundabout

Intersection Performance - Hourly Values			
Performance Measure	**Vehicles:**	**All MCs**	**Persons**
Travel Speed (Average)	km/h	52.3	52.3 km/h
Travel Distance (Total)	veh-km/h	1163.2	1395.9 pers-km/h
Travel Time (Total)	veh-h/h	22.2	26.7 pers-h/h
Desired Speed	km/h	67.6	
Speed Efficiency		0.77	
Travel Time Index		7.49	
Congestion Coefficient		1.29	
Demand Flows (Total)	veh/h	1931	2317 pers/h
Arrival Flows (Total)	veh/h	1931	
Percent Heavy Vehicles (Demand)	%	5.2	
Percent Heavy Vehicles (Arrivals)	%	5.2	
Degree of Saturation		0.510	
Practical Spare Capacity	%	66.7	
Effective Intersection Capacity	veh/h	3786	
Control Delay (Total)	veh-h/h	3.03	3.63 pers-h/h
Control Delay (Average)	sec	5.6	5.6 sec
Control Delay (Worst Lane by MC)	sec	9.0	
Control Delay (Worst Movement by MC)	sec	16.5	16.5 sec
Geometric Delay (Average)	sec	4.3	
Stop-Line Delay (Average)	sec	1.3	
Idling Time (Average)	sec	0.1	
Intersection Level of Service (LOS)		LOS A	
95% Back of Queue - Veh (Worst Lane)	veh	3.9	
95% Back of Queue - Dist (Worst Lane)	m	28.8	
Ave. Que Storage Ratio (Worst Lane)		0.13	
Effective Stops (Total)	veh/h	955	1146 pers/h
Effective Stop Rate		0.49	0.49
Proportion Queued		0.46	0.46
Performance Index		47.1	47.1
Cost (Total)	$/h	1175.09	1175.09 $/h
Fuel Consumption (Total)	L/h	150.8	
Carbon Dioxide (Total)	kg/h	358.4	
Hydrocarbons (Total)	kg/h	0.034	
Carbon Monoxide (Total)	kg/h	0.47	
NOx (Total)	kg/h	0.776	

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Intersection LOS value for Vehicles is based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand effects.
In Network analysis, Arrival Flows will be reduced if Upstream Capacity Constraint exists.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
Site Model Variability Index (Average value of largest changes in Lane Degrees of Saturation from the third to the last Main (Timing-Capacity) Iterations): 2.5 %
Number of Iterations: 7 (Maximum: 10)
Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 2.1% 1.1% 0.6%

Intersection Performance - Annual Values			
Performance Measure	**Vehicles:**	**All MCs**	**Persons**
Demand Flows (Total)	veh/y	926,653	1,111,983 pers/y

Delay (Total)	veh-h/y	1,453	1,743	pers-h/y
Effective Stops (Total)	veh/y	458,587	550,304	pers/y
Travel Distance (Total)	veh-km/y	558,341	670,009	pers-km/y
Travel Time (Total)	veh-h/y	10,667	12,800	pers-h/y
Cost (Total)	$/y	564,044	564,044	$/y
Fuel Consumption (Total)	L/y	72,367		
Carbon Dioxide (Total)	kg/y	172,052		
Hydrocarbons (Total)	kg/y	16		
Carbon Monoxide (Total)	kg/y	225		
NOx (Total)	kg/y	373		

1 Hours per Year: 480 (Site)

INTERSECTION SUMMARY

Site: 101C [AM Future 2033 Weekday Peak 8:00am - 9:00am (Site Folder: Kingsland Parade and Clarrie Hermes Drive)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

NA
Site Category: (None)
Roundabout

Intersection Performance - Hourly Values				
Performance Measure	**Vehicles:**	**All MCs**	**Persons**	
Travel Speed (Average)	km/h	51.0	51.0	km/h
Travel Distance (Total)	veh-km/h	1401.9	1682.2	pers-km/h
Travel Time (Total)	veh-h/h	27.5	33.0	pers-h/h
Desired Speed	km/h	68.1		
Speed Efficiency		0.75		
Travel Time Index		7.21		
Congestion Coefficient		1.33		
Demand Flows (Total)	veh/h	2315	2778	pers/h
Arrival Flows (Total)	veh/h	2315		
Percent Heavy Vehicles (Demand)	%	5.2		
Percent Heavy Vehicles (Arrivals)	%	5.2		
Degree of Saturation		0.638		
Practical Spare Capacity	%	33.3		
Effective Intersection Capacity	veh/h	3630		
Control Delay (Total)	veh-h/h	4.27	5.13	pers-h/h
Control Delay (Average)	sec	6.6	6.6	sec
Control Delay (Worst Lane by MC)	sec	11.6		
Control Delay (Worst Movement by MC)	sec	16.9	16.9	sec
Geometric Delay (Average)	sec	4.4		
Stop-Line Delay (Average)	sec	2.3		
Idling Time (Average)	sec	0.5		
Intersection Level of Service (LOS)		LOS A		
95% Back of Queue - Veh (Worst Lane)	veh	5.9		
95% Back of Queue - Dist (Worst Lane)	m	43.7		
Ave. Que Storage Ratio (Worst Lane)		0.23		
Effective Stops (Total)	veh/h	1301	1561	pers/h
Effective Stop Rate		0.56	0.56	
Proportion Queued		0.57	0.57	
Performance Index		66.3	66.3	
Cost (Total)	$/h	1457.16	1457.16	$/h
Fuel Consumption (Total)	L/h	187.9		
Carbon Dioxide (Total)	kg/h	446.7		
Hydrocarbons (Total)	kg/h	0.043		
Carbon Monoxide (Total)	kg/h	0.58		
NOx (Total)	kg/h	0.978		

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Intersection LOS value for Vehicles is based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand effects.
In Network analysis, Arrival Flows will be reduced if Upstream Capacity Constraint exists.

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

Site Model Variability Index (Average value of largest changes in Lane Degrees of Saturation from the third to the last Main (Timing-Capacity) Iterations): 3.6 %

Number of Iterations: 8 (Maximum: 10)

Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 2.0% 1.1% 0.6%

Intersection Performance - Annual Values				
Performance Measure	**Vehicles:**	**All MCs**	**Persons**	
Demand Flows (Total)	veh/y	1,111,074	1,333,289	pers/y
Delay (Total)	veh-h/y	2,050	2,460	pers-h/y

Effective Stops (Total)	veh/y	624,524	749,429	pers/y
Travel Distance (Total)	veh-km/y	672,889	807,467	pers-km/y
Travel Time (Total)	veh-h/y	13,192	15,830	pers-h/y
Cost (Total)	$/y	699,437	699,437	$/y
Fuel Consumption (Total)	L/y	90,195		
Carbon Dioxide (Total)	kg/y	214,398		
Hydrocarbons (Total)	kg/y	20		
Carbon Monoxide (Total)	kg/y	280		
NOx (Total)	kg/y	469		

1 Hours per Year: 480 (Site)

INTERSECTION SUMMARY

Site: 101D [PM Base 2022 Weekday Peak 5:15pm - 6:15pm (Site Folder: Kingsland Parade and Clarrie Hermes Drive)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

NA
Site Category: (None)
Roundabout

Intersection Performance - Hourly Values				
Performance Measure	**Vehicles:**	**All MCs**	**Persons**	
Travel Speed (Average)	km/h	51.3	51.3	km/h
Travel Distance (Total)	veh-km/h	1286.6	1543.9	pers-km/h
Travel Time (Total)	veh-h/h	25.1	30.1	pers-h/h
Desired Speed	km/h	70.0		
Speed Efficiency		0.73		
Travel Time Index		7.02		
Congestion Coefficient		1.37		
Demand Flows (Total)	veh/h	2184	2621	pers/h
Arrival Flows (Total)	veh/h	2184		
Percent Heavy Vehicles (Demand)	%	1.5		
Percent Heavy Vehicles (Arrivals)	%	1.5		
Degree of Saturation		0.629		
Practical Spare Capacity	%	35.1		
Effective Intersection Capacity	veh/h	3472		
Control Delay (Total)	veh-h/h	4.03	4.84	pers-h/h
Control Delay (Average)	sec	6.6	6.6	sec
Control Delay (Worst Lane by MC)	sec	8.0		
Control Delay (Worst Movement by MC)	sec	14.8	14.8	sec
Geometric Delay (Average)	sec	5.0		
Stop-Line Delay (Average)	sec	1.6		
Idling Time (Average)	sec	0.1		
Intersection Level of Service (LOS)		LOS A		
95% Back of Queue - Veh (Worst Lane)	veh	5.6		
95% Back of Queue - Dist (Worst Lane)	m	39.6		
Ave. Que Storage Ratio (Worst Lane)		0.13		
Effective Stops (Total)	veh/h	1213	1455	pers/h
Effective Stop Rate		0.56	0.56	
Proportion Queued		0.61	0.61	
Performance Index		55.5	55.5	
Cost (Total)	$/h	1281.90	1281.90	$/h
Fuel Consumption (Total)	L/h	153.5		
Carbon Dioxide (Total)	kg/h	362.0		
Hydrocarbons (Total)	kg/h	0.038		
Carbon Monoxide (Total)	kg/h	0.52		
NOx (Total)	kg/h	0.363		

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Intersection LOS value for Vehicles is based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand effects.
In Network analysis, Arrival Flows will be reduced if Upstream Capacity Constraint exists.

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

Site Model Variability Index (Average value of largest changes in Lane Degrees of Saturation from the third to the last Main (Timing-Capacity) Iterations): 3.5 %

Number of Iterations: 7 (Maximum: 10)

Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 3.0% 1.6% 0.9%

Intersection Performance - Annual Values				
Performance Measure	**Vehicles:**	**All MCs**	**Persons**	
Demand Flows (Total)	veh/y	1,048,421	1,258,105	pers/y
Delay (Total)	veh-h/y	1,936	2,323	pers-h/y

Effective Stops (Total)	veh/y	582,015	698,418	pers/y
Travel Distance (Total)	veh-km/y	617,549	741,059	pers-km/y
Travel Time (Total)	veh-h/y	12,048	14,458	pers-h/y
Cost (Total)	$/y	615,311	615,311	$/y
Fuel Consumption (Total)	L/y	73,678		
Carbon Dioxide (Total)	kg/y	173,752		
Hydrocarbons (Total)	kg/y	18		
Carbon Monoxide (Total)	kg/y	251		
NOx (Total)	kg/y	174		

1 Hours per Year: 480 (Site)

INTERSECTION SUMMARY

Site: 101D [PM Development 2023 Weekday Peak 5:15pm - 6:15pm (Site Folder: Kingsland Parade and Clarrie Hermes Drive)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

NA
Site Category: (None)
Roundabout

Intersection Performance - Hourly Values			
Performance Measure	**Vehicles:**	**All MCs**	**Persons**
Travel Speed (Average)	km/h	49.8	49.8 km/h
Travel Distance (Total)	veh-km/h	1380.6	1656.8 pers-km/h
Travel Time (Total)	veh-h/h	27.7	33.2 pers-h/h
Desired Speed	km/h	70.2	
Speed Efficiency		0.71	
Travel Time Index		6.78	
Congestion Coefficient		1.41	
Demand Flows (Total)	veh/h	2375	2850 pers/h
Arrival Flows (Total)	veh/h	2375	
Percent Heavy Vehicles (Demand)	%	1.2	
Percent Heavy Vehicles (Arrivals)	%	1.2	
Degree of Saturation		0.715	
Practical Spare Capacity	%	18.8	
Effective Intersection Capacity	veh/h	3319	
Control Delay (Total)	veh-h/h	5.22	6.26 pers-h/h
Control Delay (Average)	sec	7.9	7.9 sec
Control Delay (Worst Lane by MC)	sec	10.1	
Control Delay (Worst Movement by MC)	sec	15.4	15.4 sec
Geometric Delay (Average)	sec	5.4	
Stop-Line Delay (Average)	sec	2.5	
Idling Time (Average)	sec	0.1	
Intersection Level of Service (LOS)		LOS A	
95% Back of Queue - Veh (Worst Lane)	veh	8.2	
95% Back of Queue - Dist (Worst Lane)	m	57.6	
Ave. Que Storage Ratio (Worst Lane)		0.16	
Effective Stops (Total)	veh/h	1518	1822 pers/h
Effective Stop Rate		0.64	0.64
Proportion Queued		0.73	0.73
Performance Index		69.8	69.8
Cost (Total)	$/h	1409.52	1409.52 $/h
Fuel Consumption (Total)	L/h	167.5	
Carbon Dioxide (Total)	kg/h	394.7	
Hydrocarbons (Total)	kg/h	0.042	
Carbon Monoxide (Total)	kg/h	0.57	
NOx (Total)	kg/h	0.329	

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Intersection LOS value for Vehicles is based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand effects.
In Network analysis, Arrival Flows will be reduced if Upstream Capacity Constraint exists.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
Site Model Variability Index (Average value of largest changes in Lane Degrees of Saturation from the third to the last Main (Timing-Capacity) Iterations): 4.2 %
Number of Iterations: 8 (Maximum: 10)
Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 2.5% 1.4% 0.7%

Intersection Performance - Annual Values			
Performance Measure	**Vehicles:**	**All MCs**	**Persons**
Demand Flows (Total)	veh/y	1,139,874	1,367,849 pers/y

Delay (Total)	veh-h/y	2,505	3,006	pers-h/y
Effective Stops (Total)	veh/y	728,606	874,327	pers/y
Travel Distance (Total)	veh-km/y	662,703	795,244	pers-km/y
Travel Time (Total)	veh-h/y	13,294	15,953	pers-h/y
Cost (Total)	$/y	676,571	676,571	$/y
Fuel Consumption (Total)	L/y	80,416		
Carbon Dioxide (Total)	kg/y	189,441		
Hydrocarbons (Total)	kg/y	20		
Carbon Monoxide (Total)	kg/y	273		
NOx (Total)	kg/y	158		

1 Hours per Year: 480 (Site)

INTERSECTION SUMMARY

Site: 101D [PM Future 2033 Weekday Peak 5:15pm - 6:15pm (Site Folder: Kingsland Parade and Clarrie Hermes Drive)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

NA
Site Category: (None)
Roundabout

Intersection Performance - Hourly Values				
Performance Measure	**Vehicles:**	**All MCs**	**Persons**	
Travel Speed (Average)	km/h	43.7	43.7	km/h
Travel Distance (Total)	veh-km/h	1677.8	2013.4	pers-km/h
Travel Time (Total)	veh-h/h	38.4	46.0	pers-h/h
Desired Speed	km/h	70.0		
Speed Efficiency		0.62		
Travel Time Index		5.83		
Congestion Coefficient		1.60		
Demand Flows (Total)	veh/h	2879	3455	pers/h
Arrival Flows (Total)	veh/h	2879		
Percent Heavy Vehicles (Demand)	%	1.5		
Percent Heavy Vehicles (Arrivals)	%	1.5		
Degree of Saturation		0.930		
Practical Spare Capacity	%	-8.6		
Effective Intersection Capacity	veh/h	3094		
Control Delay (Total)	veh-h/h	11.99	14.38	pers-h/h
Control Delay (Average)	sec	15.0	15.0	sec
Control Delay (Worst Lane by MC)	sec	19.0		
Control Delay (Worst Movement by MC)	sec	25.0	25.0	sec
Geometric Delay (Average)	sec	5.3		
Stop-Line Delay (Average)	sec	9.7		
Idling Time (Average)	sec	2.2		
Intersection Level of Service (LOS)		LOS B		
95% Back of Queue - Veh (Worst Lane)	veh	24.3		
95% Back of Queue - Dist (Worst Lane)	m	172.5		
Ave. Que Storage Ratio (Worst Lane)		0.48		
Effective Stops (Total)	veh/h	2869	3443	pers/h
Effective Stop Rate		1.00	1.00	
Proportion Queued		0.97	0.97	
Performance Index		150.2	150.2	
Cost (Total)	$/h	1937.65	1937.65	$/h
Fuel Consumption (Total)	L/h	226.6		
Carbon Dioxide (Total)	kg/h	534.2		
Hydrocarbons (Total)	kg/h	0.056		
Carbon Monoxide (Total)	kg/h	0.73		
NOx (Total)	kg/h	0.540		

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Intersection LOS value for Vehicles is based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand effects.
In Network analysis, Arrival Flows will be reduced if Upstream Capacity Constraint exists.

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

Site Model Variability Index (Average value of largest changes in Lane Degrees of Saturation from the third to the last Main (Timing-Capacity) Iterations): 6.2 %

Number of Iterations: 9 (Maximum: 10)

Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 2.8% 1.6% 0.9%

Intersection Performance - Annual Values				
Performance Measure	**Vehicles:**	**All MCs**	**Persons**	
Demand Flows (Total)	veh/y	1,381,895	1,658,274	pers/y
Delay (Total)	veh-h/y	5,754	6,905	pers-h/y

Effective Stops (Total)	veh/y	1,377,312	1,652,775	pers/y
Travel Distance (Total)	veh-km/y	805,368	966,441	pers-km/y
Travel Time (Total)	veh-h/y	18,415	22,098	pers-h/y
Cost (Total)	$/y	930,070	930,070	$/y
Fuel Consumption (Total)	L/y	108,763		
Carbon Dioxide (Total)	kg/y	256,404		
Hydrocarbons (Total)	kg/y	27		
Carbon Monoxide (Total)	kg/y	351		
NOx (Total)	kg/y	259		

1 Hours per Year: 480 (Site)

MOVEMENT SUMMARY

Site: 101C [AM Base 2022 Weekday Peak 8:00am - 9:00am (Site Folder: Kingsland Parade and Clarrie Hermes Drive)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

NA
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival 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	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Clarrie Hermes Drive															
1	L2	All MCs	6	0.0	6	0.0	0.040	5.3	LOS A	0.2	1.7	0.71	0.67	0.71	39.5
2	T1	All MCs	4	0.0	4	0.0	0.040	4.2	LOS A	0.2	1.7	0.71	0.67	0.71	33.6
3	R2	All MCs	24	0.0	24	0.0	0.040	11.1	LOS A	0.2	1.7	0.71	0.67	0.71	39.2
Approach			35	0.0	35	0.0	0.040	9.2	LOS A	0.2	1.7	0.71	0.67	0.71	38.8
East: Clarrie Hermes Drive															
4	L2	All MCs	28	0.0	28	0.0	0.513	5.4	LOS A	3.9	28.8	0.41	0.48	0.41	54.7
5	T1	All MCs	655	5.5	655	5.5	0.513	5.4	LOS A	3.9	28.8	0.41	0.48	0.41	60.1
6	R2	All MCs	86	7.3	86	7.3	0.513	13.3	LOS A	3.9	28.8	0.41	0.48	0.41	41.7
6u	U	All MCs	6	0.0	6	0.0	0.513	16.4	LOS B	3.9	28.8	0.41	0.48	0.41	58.9
Approach			776	5.4	776	5.4	0.513	6.4	LOS A	3.9	28.8	0.41	0.48	0.41	57.9
North: Kingsland Parade															
7	L2	All MCs	179	5.9	179	5.9	0.306	3.1	LOS A	1.9	14.1	0.67	0.57	0.67	35.5
8	T1	All MCs	3	0.0	3	0.0	0.306	2.8	LOS A	1.9	14.1	0.67	0.57	0.67	32.3
9	R2	All MCs	133	3.2	133	3.2	0.306	7.5	LOS A	1.9	14.1	0.67	0.57	0.67	35.0
Approach			315	4.7	315	4.7	0.306	4.9	LOS A	1.9	14.1	0.67	0.57	0.67	35.3
West: Clarrie Hermes Drive															
10	L2	All MCs	108	2.9	108	2.9	0.432	5.4	LOS A	2.8	20.8	0.33	0.44	0.33	41.7
11	T1	All MCs	546	6.4	546	6.4	0.432	5.3	LOS A	2.8	20.8	0.33	0.44	0.33	61.5
12	R2	All MCs	8	0.0	8	0.0	0.432	13.1	LOS A	2.8	20.8	0.33	0.44	0.33	54.4
Approach			663	5.7	663	5.7	0.432	5.4	LOS A	2.8	20.8	0.33	0.44	0.33	58.4
All Vehicles			1788	5.3	1788	5.3	0.513	5.8	LOS A	3.9	28.8	0.43	0.49	0.43	53.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 101C [AM Development 2023 Weekday Peak 8:00am - 9:00am (Site Folder: Kingsland Parade and Clarrie Hermes Drive)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

NA
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival 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	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Clarrie Hermes Drive															
1	L2	All MCs	7	0.0	7	0.0	0.044	5.3	LOS A	0.3	1.9	0.72	0.67	0.72	39.6
2	T1	All MCs	5	0.0	5	0.0	0.044	4.2	LOS A	0.3	1.9	0.72	0.67	0.72	33.7
3	R2	All MCs	25	0.0	25	0.0	0.044	11.1	LOS A	0.3	1.9	0.72	0.67	0.72	39.3
Approach			38	0.0	38	0.0	0.044	9.0	LOS A	0.3	1.9	0.72	0.67	0.72	38.9
East: Clarrie Hermes Drive															
4	L2	All MCs	29	0.0	29	0.0	0.510	5.6	LOS A	3.9	28.8	0.46	0.49	0.46	54.7
5	T1	All MCs	668	5.5	668	5.5	0.510	5.6	LOS A	3.9	28.8	0.46	0.49	0.46	60.1
6	R2	All MCs	43	17.1	43	17.1	0.510	13.7	LOS A	3.9	28.8	0.46	0.49	0.46	41.5
6u	U	All MCs	7	0.0	7	0.0	0.510	16.5	LOS B	3.9	28.8	0.46	0.49	0.46	58.9
Approach			748	5.9	748	5.9	0.510	6.1	LOS A	3.9	28.8	0.46	0.49	0.46	58.9
North: Kingsland Parade															
7	L2	All MCs	299	3.9	299	3.9	0.445	3.6	LOS A	3.1	22.3	0.73	0.60	0.73	35.4
8	T1	All MCs	4	0.0	4	0.0	0.445	3.3	LOS A	3.1	22.3	0.73	0.60	0.73	32.1
9	R2	All MCs	158	3.3	158	3.3	0.445	8.0	LOS A	3.1	22.3	0.73	0.60	0.73	35.0
Approach			461	3.7	461	3.7	0.445	5.1	LOS A	3.1	22.3	0.73	0.60	0.73	35.2
West: Clarrie Hermes Drive															
10	L2	All MCs	116	3.6	116	3.6	0.428	5.2	LOS A	2.8	20.6	0.26	0.42	0.26	42.1
11	T1	All MCs	558	6.4	558	6.4	0.428	5.2	LOS A	2.8	20.6	0.26	0.42	0.26	62.2
12	R2	All MCs	9	0.0	9	0.0	0.428	12.9	LOS A	2.8	20.6	0.26	0.42	0.26	55.1
Approach			683	5.9	683	5.9	0.428	5.3	LOS A	2.8	20.6	0.26	0.42	0.26	58.9
All Vehicles			1931	5.2	1931	5.2	0.510	5.6	LOS A	3.9	28.8	0.46	0.49	0.46	52.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 101C [AM Future 2033 Weekday Peak 8:00am - 9:00am (Site Folder: Kingsland Parade and Clarrie Hermes Drive)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

NA
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival 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	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Clarrie Hermes Drive															
1	L2	All MCs	8	0.0	8	0.0	0.067	7.7	LOS A	0.5	3.3	0.86	0.74	0.86	37.7
2	T1	All MCs	5	0.0	5	0.0	0.067	6.5	LOS A	0.5	3.3	0.86	0.74	0.86	31.2
3	R2	All MCs	31	0.0	31	0.0	0.067	13.5	LOS A	0.5	3.3	0.86	0.74	0.86	37.5
Approach			44	0.0	44	0.0	0.067	11.6	LOS A	0.5	3.3	0.86	0.74	0.86	37.1
East: Clarrie Hermes Drive															
4	L2	All MCs	36	0.0	36	0.0	0.638	5.9	LOS A	5.9	43.7	0.59	0.51	0.59	53.2
5	T1	All MCs	816	5.5	816	5.5	0.638	5.9	LOS A	5.9	43.7	0.59	0.51	0.59	58.8
6	R2	All MCs	51	16.7	51	16.7	0.638	14.0	LOS A	5.9	43.7	0.59	0.51	0.59	40.5
6u	U	All MCs	8	0.0	8	0.0	0.638	16.9	LOS B	5.9	43.7	0.59	0.51	0.59	57.7
Approach			911	5.9	911	5.9	0.638	6.4	LOS A	5.9	43.7	0.59	0.51	0.59	57.6
North: Kingsland Parade															
7	L2	All MCs	338	4.0	338	4.0	0.576	7.0	LOS A	5.6	40.1	0.87	0.84	1.08	33.0
8	T1	All MCs	4	0.0	4	0.0	0.576	6.7	LOS A	5.6	40.1	0.87	0.84	1.08	28.6
9	R2	All MCs	186	2.8	186	2.8	0.576	11.4	LOS A	5.6	40.1	0.87	0.84	1.08	32.6
Approach			528	3.6	528	3.6	0.576	8.5	LOS A	5.6	40.1	0.87	0.84	1.08	32.8
West: Clarrie Hermes Drive															
10	L2	All MCs	140	3.0	140	3.0	0.527	5.3	LOS A	4.0	29.7	0.33	0.43	0.33	41.6
11	T1	All MCs	681	6.5	681	6.5	0.527	5.3	LOS A	4.0	29.7	0.33	0.43	0.33	61.4
12	R2	All MCs	11	0.0	11	0.0	0.527	13.0	LOS A	4.0	29.7	0.33	0.43	0.33	54.3
Approach			832	5.8	832	5.8	0.527	5.4	LOS A	4.0	29.7	0.33	0.43	0.33	58.2
All Vehicles			2315	5.2	2315	5.2	0.638	6.6	LOS A	5.9	43.7	0.57	0.56	0.62	51.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 101D [PM Base 2022 Weekday Peak 5:15pm - 6:15pm (Site Folder: Kingsland Parade and Clarrie Hermes Drive)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

NA
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival 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	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Clarrie Hermes Drive															
1	L2	All MCs	1	0.0	1	0.0	0.028	6.4	LOS A	0.2	1.3	0.79	0.64	0.79	40.2
2	T1	All MCs	12	0.0	12	0.0	0.028	5.2	LOS A	0.2	1.3	0.79	0.64	0.79	34.4
3	R2	All MCs	8	0.0	8	0.0	0.028	12.2	LOS A	0.2	1.3	0.79	0.64	0.79	39.8
Approach			21	0.0	21	0.0	0.028	8.0	LOS A	0.2	1.3	0.79	0.64	0.79	37.6
East: Clarrie Hermes Drive															
4	L2	All MCs	41	0.0	41	0.0	0.580	5.9	LOS A	4.9	34.4	0.57	0.55	0.57	52.6
5	T1	All MCs	616	0.7	616	0.7	0.580	5.9	LOS A	4.9	34.4	0.57	0.55	0.57	59.0
6	R2	All MCs	177	1.8	177	1.8	0.580	13.7	LOS A	4.9	34.4	0.57	0.55	0.57	50.1
Approach			834	0.9	834	0.9	0.580	7.5	LOS A	4.9	34.4	0.57	0.55	0.57	57.1
North: Kingsland Parade															
7	L2	All MCs	187	0.0	187	0.0	0.429	3.8	LOS A	3.2	22.9	0.81	0.66	0.81	34.7
8	T1	All MCs	6	0.0	6	0.0	0.429	3.6	LOS A	3.2	22.9	0.81	0.66	0.81	31.3
9	R2	All MCs	206	4.6	206	4.6	0.429	8.4	LOS A	3.2	22.9	0.81	0.66	0.81	34.3
Approach			400	2.4	400	2.4	0.429	6.1	LOS A	3.2	22.9	0.81	0.66	0.81	34.5
West: Clarrie Hermes Drive															
10	L2	All MCs	261	0.8	261	0.8	0.629	5.9	LOS A	5.6	39.6	0.55	0.52	0.55	40.1
11	T1	All MCs	651	2.3	651	2.3	0.629	5.9	LOS A	5.6	39.6	0.55	0.52	0.55	60.2
12	R2	All MCs	18	0.0	18	0.0	0.629	13.7	LOS A	5.6	39.6	0.55	0.52	0.55	52.0
Approach			929	1.8	929	1.8	0.629	6.0	LOS A	5.6	39.6	0.55	0.52	0.55	54.6
All Vehicles			2184	1.5	2184	1.5	0.629	6.6	LOS A	5.6	39.6	0.61	0.56	0.61	51.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 101D [PM Development 2023 Weekday Peak 5:15pm - 6:15pm (Site Folder: Kingsland Parade and Clarrie Hermes Drive)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

NA
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival 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	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Clarrie Hermes Drive															
1	L2	All MCs	2	0.0	2	0.0	0.040	8.5	LOS A	0.3	2.1	0.89	0.72	0.89	38.7
2	T1	All MCs	13	0.0	13	0.0	0.040	7.3	LOS A	0.3	2.1	0.89	0.72	0.89	32.3
3	R2	All MCs	9	0.0	9	0.0	0.040	14.3	LOS A	0.3	2.1	0.89	0.72	0.89	38.4
Approach			24	0.0	24	0.0	0.040	10.1	LOS A	0.3	2.1	0.89	0.72	0.89	36.0
East: Clarrie Hermes Drive															
4	L2	All MCs	42	0.0	42	0.0	0.677	6.2	LOS A	6.6	46.7	0.66	0.58	0.66	51.2
5	T1	All MCs	629	0.8	629	0.8	0.677	6.1	LOS A	6.6	46.7	0.66	0.58	0.66	57.7
6	R2	All MCs	297	1.4	297	1.4	0.677	14.0	LOS A	6.6	46.7	0.66	0.58	0.66	48.8
Approach			968	1.0	968	1.0	0.677	8.5	LOS A	6.6	46.7	0.66	0.58	0.66	55.1
North: Kingsland Parade															
7	L2	All MCs	202	0.0	202	0.0	0.475	4.3	LOS A	4.0	28.4	0.86	0.72	0.91	34.5
8	T1	All MCs	7	0.0	7	0.0	0.475	4.2	LOS A	4.0	28.4	0.86	0.72	0.91	30.9
9	R2	All MCs	211	4.5	211	4.5	0.475	8.9	LOS A	4.0	28.4	0.86	0.72	0.91	34.0
Approach			420	2.3	420	2.3	0.475	6.6	LOS A	4.0	28.4	0.86	0.72	0.91	34.2
West: Clarrie Hermes Drive															
10	L2	All MCs	288	1.1	288	1.1	0.715	7.7	LOS A	8.2	57.6	0.75	0.66	0.83	38.7
11	T1	All MCs	655	0.8	655	0.8	0.715	7.6	LOS A	8.2	57.6	0.75	0.66	0.83	58.6
12	R2	All MCs	19	0.0	19	0.0	0.715	15.4	LOS B	8.2	57.6	0.75	0.66	0.83	50.0
Approach			962	0.9	962	0.9	0.715	7.8	LOS A	8.2	57.6	0.75	0.66	0.83	52.7
All Vehicles			2375	1.2	2375	1.2	0.715	7.9	LOS A	8.2	57.6	0.73	0.64	0.77	49.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 101D [PM Future 2033 Weekday Peak 5:15pm - 6:15pm (Site Folder: Kingsland Parade and Clarrie Hermes Drive)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

NA
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival 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	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Clarrie Hermes Drive															
1	L2	All MCs	2	0.0	2	0.0	0.080	15.5	LOS B	0.7	4.7	1.00	0.84	1.00	33.7
2	T1	All MCs	15	0.0	15	0.0	0.080	14.3	LOS A	0.7	4.7	1.00	0.84	1.00	26.0
3	R2	All MCs	11	0.0	11	0.0	0.080	21.3	LOS B	0.7	4.7	1.00	0.84	1.00	33.6
Approach			27	0.0	27	0.0	0.080	17.1	LOS B	0.7	4.7	1.00	0.84	1.00	30.3
East: Clarrie Hermes Drive															
4	L2	All MCs	52	0.0	52	0.0	0.853	9.6	LOS A	14.8	104.6	0.93	0.79	1.11	48.2
5	T1	All MCs	766	0.7	766	0.7	0.853	9.6	LOS A	14.8	104.6	0.93	0.79	1.11	54.9
6	R2	All MCs	336	1.3	336	1.3	0.853	17.4	LOS B	14.8	104.6	0.93	0.79	1.11	45.8
Approach			1154	0.8	1154	0.8	0.853	11.8	LOS A	14.8	104.6	0.93	0.79	1.11	52.4
North: Kingsland Parade															
7	L2	All MCs	244	0.0	244	0.0	0.791	16.6	LOS B	11.7	83.5	1.00	1.25	1.62	27.4
8	T1	All MCs	8	0.0	8	0.0	0.791	16.4	LOS B	11.7	83.5	1.00	1.25	1.62	21.7
9	R2	All MCs	266	4.0	266	4.0	0.791	21.2	LOS B	11.7	83.5	1.00	1.25	1.62	27.0
Approach			519	2.0	519	2.0	0.791	19.0	LOS B	11.7	83.5	1.00	1.25	1.62	27.1
West: Clarrie Hermes Drive															
10	L2	All MCs	346	0.9	346	0.9	0.930	16.1	LOS B	24.3	172.5	1.00	1.09	1.58	33.3
11	T1	All MCs	809	2.3	809	2.3	0.930	16.1	LOS B	24.3	172.5	1.00	1.09	1.58	50.5
12	R2	All MCs	23	0.0	23	0.0	0.930	23.9	LOS B	24.3	172.5	1.00	1.09	1.58	42.0
Approach			1179	1.9	1179	1.9	0.930	16.3	LOS B	24.3	172.5	1.00	1.09	1.58	45.5
All Vehicles			2879	1.5	2879	1.5	0.930	15.0	LOS B	24.3	172.5	0.97	1.00	1.40	43.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

INTERSECTION SUMMARY

Site: 101E [AM Base 2022 Weekday Peak 8:00am - 9:00am (Site Folder: Overall Avenue and Horse Park Drive)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

New Site
Site Category: (None)
Roundabout

Intersection Performance - Hourly Values				
Performance Measure	**Vehicles:**	**All MCs**	**Persons**	
Travel Speed (Average)	km/h	51.8	51.8	km/h
Travel Distance (Total)	veh-km/h	1682.4	2018.9	pers-km/h
Travel Time (Total)	veh-h/h	32.5	39.0	pers-h/h
Desired Speed	km/h	72.5		
Speed Efficiency		0.71		
Travel Time Index		6.83		
Congestion Coefficient		1.40		
Demand Flows (Total)	veh/h	2088	2506	pers/h
Arrival Flows (Total)	veh/h	2088		
Percent Heavy Vehicles (Demand)	%	3.2		
Percent Heavy Vehicles (Arrivals)	%	3.2		
Degree of Saturation		0.869		
Practical Spare Capacity	%	-2.2		
Effective Intersection Capacity	veh/h	2404		
Control Delay (Total)	veh-h/h	7.01	8.41	pers-h/h
Control Delay (Average)	sec	12.1	12.1	sec
Control Delay (Worst Lane by MC)	sec	16.7		
Control Delay (Worst Movement by MC)	sec	25.5	25.5	sec
Geometric Delay (Average)	sec	6.3		
Stop-Line Delay (Average)	sec	5.8		
Idling Time (Average)	sec	1.1		
Intersection Level of Service (LOS)		LOS A		
95% Back of Queue - Veh (Worst Lane)	veh	16.6		
95% Back of Queue - Dist (Worst Lane)	m	119.1		
Ave. Que Storage Ratio (Worst Lane)		0.10		
Effective Stops (Total)	veh/h	1583	1899	pers/h
Effective Stop Rate		0.76	0.76	
Proportion Queued		0.86	0.86	
Performance Index		95.6	95.6	
Cost (Total)	$/h	1678.05	1678.05	$/h
Fuel Consumption (Total)	L/h	205.7		
Carbon Dioxide (Total)	kg/h	487.0		
Hydrocarbons (Total)	kg/h	0.049		
Carbon Monoxide (Total)	kg/h	0.71		
NOx (Total)	kg/h	0.801		

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Intersection LOS value for Vehicles is based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand effects.
In Network analysis, Arrival Flows will be reduced if Upstream Capacity Constraint exists.

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

Site Model Variability Index (Average value of largest changes in Lane Degrees of Saturation from the third to the last Main (Timing-Capacity) Iterations): 6.4 %

Number of Iterations: 9 (Maximum: 10)

Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 2.5% 1.4% 0.8%

Intersection Performance - Annual Values				
Performance Measure	**Vehicles:**	**All MCs**	**Persons**	
Demand Flows (Total)	veh/y	1,002,442	1,202,931	pers/y
Delay (Total)	veh-h/y	3,366	4,039	pers-h/y

Effective Stops (Total)	veh/y	759,626	911,551	pers/y
Travel Distance (Total)	veh-km/y	807,549	969,059	pers-km/y
Travel Time (Total)	veh-h/y	15,593	18,712	pers-h/y
Cost (Total)	$/y	805,464	805,464	$/y
Fuel Consumption (Total)	L/y	98,724		
Carbon Dioxide (Total)	kg/y	233,755		
Hydrocarbons (Total)	kg/y	23		
Carbon Monoxide (Total)	kg/y	341		
NOx (Total)	kg/y	384		

1 Hours per Year: 480 (Site)

INTERSECTION SUMMARY

Site: 101E [AM Development 2023 Weekday Peak 8:00am - 9:00am (Site Folder: Overall Avenue and Horse Park Drive)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

New Site
Site Category: (None)
Roundabout

Intersection Performance - Hourly Values			
Performance Measure	**Vehicles:**	**All MCs**	**Persons**
Travel Speed (Average)	km/h	49.9	49.9 km/h
Travel Distance (Total)	veh-km/h	1741.4	2089.7 pers-km/h
Travel Time (Total)	veh-h/h	34.9	41.9 pers-h/h
Desired Speed	km/h	72.4	
Speed Efficiency		0.69	
Travel Time Index		6.54	
Congestion Coefficient		1.45	
Demand Flows (Total)	veh/h	2174	2608 pers/h
Arrival Flows (Total)	veh/h	2174	
Percent Heavy Vehicles (Demand)	%	3.5	
Percent Heavy Vehicles (Arrivals)	%	3.5	
Degree of Saturation		0.912	
Practical Spare Capacity	%	-6.8	
Effective Intersection Capacity	veh/h	2384	
Control Delay (Total)	veh-h/h	8.52	10.22 pers-h/h
Control Delay (Average)	sec	14.1	14.1 sec
Control Delay (Worst Lane by MC)	sec	18.5	
Control Delay (Worst Movement by MC)	sec	27.8	27.8 sec
Geometric Delay (Average)	sec	6.3	
Stop-Line Delay (Average)	sec	7.8	
Idling Time (Average)	sec	1.6	
Intersection Level of Service (LOS)		LOS A	
95% Back of Queue - Veh (Worst Lane)	veh	21.4	
95% Back of Queue - Dist (Worst Lane)	m	154.2	
Ave. Que Storage Ratio (Worst Lane)		0.12	
Effective Stops (Total)	veh/h	1840	2208 pers/h
Effective Stop Rate		0.85	0.85
Proportion Queued		0.89	0.89
Performance Index		112.9	112.9
Cost (Total)	$/h	1796.55	1796.55 $/h
Fuel Consumption (Total)	L/h	218.3	
Carbon Dioxide (Total)	kg/h	517.0	
Hydrocarbons (Total)	kg/h	0.052	
Carbon Monoxide (Total)	kg/h	0.74	
NOx (Total)	kg/h	0.887	

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Intersection LOS value for Vehicles is based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand effects.
In Network analysis, Arrival Flows will be reduced if Upstream Capacity Constraint exists.

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

Site Model Variability Index (Average value of largest changes in Lane Degrees of Saturation from the third to the last Main (Timing-Capacity) Iterations): 6.7 %

Number of Iterations: 9 (Maximum: 10)

Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 2.1% 1.1% 0.5%

Intersection Performance - Annual Values			
Performance Measure	**Vehicles:**	**All MCs**	**Persons**
Demand Flows (Total)	veh/y	1,043,368	1,252,042 pers/y
Delay (Total)	veh-h/y	4,087	4,905 pers-h/y

Effective Stops (Total)	veh/y	883,054	1,059,665	pers/y
Travel Distance (Total)	veh-km/y	835,888	1,003,066	pers-km/y
Travel Time (Total)	veh-h/y	16,767	20,120	pers-h/y
Cost (Total)	$/y	862,345	862,345	$/y
Fuel Consumption (Total)	L/y	104,773		
Carbon Dioxide (Total)	kg/y	248,184		
Hydrocarbons (Total)	kg/y	25		
Carbon Monoxide (Total)	kg/y	356		
NOx (Total)	kg/y	426		

1 Hours per Year: 480 (Site)

INTERSECTION SUMMARY

Site: 101E [AM Future 2033 Weekday Peak 8:00am - 9:00am (Site Folder: Overall Avenue and Horse Park Drive)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

New Site
Site Category: (None)
Roundabout

Intersection Performance - Hourly Values				
Performance Measure	**Vehicles:**	**All MCs**	**Persons**	
Travel Speed (Average)	km/h	21.3	21.3	km/h
Travel Distance (Total)	veh-km/h	2114.1	2536.9	pers-km/h
Travel Time (Total)	veh-h/h	99.2	119.1	pers-h/h
Desired Speed	km/h	72.4		
Speed Efficiency		0.29		
Travel Time Index		2.16		
Congestion Coefficient		3.40		
Demand Flows (Total)	veh/h	2636	3163	pers/h
Arrival Flows (Total)	veh/h	2636		
Percent Heavy Vehicles (Demand)	%	3.4		
Percent Heavy Vehicles (Arrivals)	%	3.4		
Degree of Saturation		1.176		
Practical Spare Capacity	%	-27.7		
Effective Intersection Capacity	veh/h	2240		
Control Delay (Total)	veh-h/h	67.33	80.79	pers-h/h
Control Delay (Average)	sec	92.0	92.0	sec
Control Delay (Worst Lane by MC)	sec	175.3		
Control Delay (Worst Movement by MC)	sec	183.6	183.6	sec
Geometric Delay (Average)	sec	6.3		
Stop-Line Delay (Average)	sec	85.6		
Idling Time (Average)	sec	52.3		
Intersection Level of Service (LOS)		LOS F		
95% Back of Queue - Veh (Worst Lane)	veh	139.9		
95% Back of Queue - Dist (Worst Lane)	m	1006.4		
Ave. Que Storage Ratio (Worst Lane)		0.81		
Effective Stops (Total)	veh/h	6005	7206	pers/h
Effective Stop Rate		2.28	2.28	
Proportion Queued		0.95	0.95	
Performance Index		456.2	456.2	
Cost (Total)	$/h	4421.54	4421.54	$/h
Fuel Consumption (Total)	L/h	367.3		
Carbon Dioxide (Total)	kg/h	869.0		
Hydrocarbons (Total)	kg/h	0.094		
Carbon Monoxide (Total)	kg/h	1.02		
NOx (Total)	kg/h	1.394		

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Intersection LOS value for Vehicles is based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand effects.
In Network analysis, Arrival Flows will be reduced if Upstream Capacity Constraint exists.

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

Site Model Variability Index (Average value of largest changes in Lane Degrees of Saturation from the third to the last Main (Timing-Capacity) Iterations): 3.6 %

Number of Iterations: 9 (Maximum: 10)

Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 2.4% 1.6% 0.9%

Intersection Performance - Annual Values				
Performance Measure	**Vehicles:**	**All MCs**	**Persons**	
Demand Flows (Total)	veh/y	1,265,179	1,518,215	pers/y
Delay (Total)	veh-h/y	32,317	38,780	pers-h/y

Effective Stops (Total)	veh/y	2,882,204	3,458,646	pers/y
Travel Distance (Total)	veh-km/y	1,014,766	1,217,720	pers-km/y
Travel Time (Total)	veh-h/y	47,635	57,162	pers-h/y
Cost (Total)	$/y	2,122,340	2,122,340	$/y
Fuel Consumption (Total)	L/y	176,327		
Carbon Dioxide (Total)	kg/y	417,118		
Hydrocarbons (Total)	kg/y	45		
Carbon Monoxide (Total)	kg/y	487		
NOx (Total)	kg/y	669		

1 Hours per Year: 480 (Site)

INTERSECTION SUMMARY

Site: 101E [PM Base 2022 Weekday Peak 5:15pm - 6:15pm (Site Folder: Overall Avenue and Horse Park Drive)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

New Site
Site Category: (None)
Roundabout

Intersection Performance - Hourly Values				
Performance Measure	**Vehicles:**	**All MCs**	**Persons**	
Travel Speed (Average)	km/h	51.8	51.8	km/h
Travel Distance (Total)	veh-km/h	1694.6	2033.5	pers-km/h
Travel Time (Total)	veh-h/h	32.7	39.3	pers-h/h
Desired Speed	km/h	73.2		
Speed Efficiency		0.71		
Travel Time Index		6.74		
Congestion Coefficient		1.41		
Demand Flows (Total)	veh/h	2124	2549	pers/h
Arrival Flows (Total)	veh/h	2124		
Percent Heavy Vehicles (Demand)	%	1.2		
Percent Heavy Vehicles (Arrivals)	%	1.2		
Degree of Saturation		0.879		
Practical Spare Capacity	%	-3.3		
Effective Intersection Capacity	veh/h	2417		
Control Delay (Total)	veh-h/h	7.18	8.62	pers-h/h
Control Delay (Average)	sec	12.2	12.2	sec
Control Delay (Worst Lane by MC)	sec	15.5		
Control Delay (Worst Movement by MC)	sec	24.2	24.2	sec
Geometric Delay (Average)	sec	6.0		
Stop-Line Delay (Average)	sec	6.2		
Idling Time (Average)	sec	0.6		
Intersection Level of Service (LOS)		LOS A		
95% Back of Queue - Veh (Worst Lane)	veh	17.3		
95% Back of Queue - Dist (Worst Lane)	m	122.3		
Ave. Que Storage Ratio (Worst Lane)		0.15		
Effective Stops (Total)	veh/h	1668	2002	pers/h
Effective Stop Rate		0.79	0.79	
Proportion Queued		0.86	0.86	
Performance Index		102.0	102.0	
Cost (Total)	$/h	1649.38	1649.38	$/h
Fuel Consumption (Total)	L/h	191.8		
Carbon Dioxide (Total)	kg/h	452.1		
Hydrocarbons (Total)	kg/h	0.048		
Carbon Monoxide (Total)	kg/h	0.71		
NOx (Total)	kg/h	0.413		

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Intersection LOS value for Vehicles is based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand effects.
In Network analysis, Arrival Flows will be reduced if Upstream Capacity Constraint exists.

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

Site Model Variability Index (Average value of largest changes in Lane Degrees of Saturation from the third to the last Main (Timing-Capacity) Iterations): 5.4 %

Number of Iterations: 8 (Maximum: 10)

Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 2.9% 1.6% 0.8%

Intersection Performance - Annual Values				
Performance Measure	**Vehicles:**	**All MCs**	**Persons**	
Demand Flows (Total)	veh/y	1,019,621	1,223,545	pers/y
Delay (Total)	veh-h/y	3,447	4,136	pers-h/y

Effective Stops (Total)	veh/y	800,831	960,998	pers/y
Travel Distance (Total)	veh-km/y	813,384	976,061	pers-km/y
Travel Time (Total)	veh-h/y	15,716	18,859	pers-h/y
Cost (Total)	$/y	791,702	791,702	$/y
Fuel Consumption (Total)	L/y	92,062		
Carbon Dioxide (Total)	kg/y	216,987		
Hydrocarbons (Total)	kg/y	23		
Carbon Monoxide (Total)	kg/y	340		
NOx (Total)	kg/y	198		

1 Hours per Year: 480 (Site)

INTERSECTION SUMMARY

Site: 101E [PM Development 2023 Weekday Peak 5:15pm - 6:15pm (Site Folder: Overall Avenue and Horse Park Drive)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

New Site
Site Category: (None)
Roundabout

Intersection Performance - Hourly Values			
Performance Measure	**Vehicles:**	**All MCs**	**Persons**
Travel Speed (Average)	km/h	49.6	49.6 km/h
Travel Distance (Total)	veh-km/h	1749.3	2099.2 pers-km/h
Travel Time (Total)	veh-h/h	35.3	42.3 pers-h/h
Desired Speed	km/h	73.1	
Speed Efficiency		0.68	
Travel Time Index		6.42	
Congestion Coefficient		1.48	
Demand Flows (Total)	veh/h	2200	2640 pers/h
Arrival Flows (Total)	veh/h	2200	
Percent Heavy Vehicles (Demand)	%	1.5	
Percent Heavy Vehicles (Arrivals)	%	1.5	
Degree of Saturation		0.924	
Practical Spare Capacity	%	-8.0	
Effective Intersection Capacity	veh/h	2382	
Control Delay (Total)	veh-h/h	8.82	10.58 pers-h/h
Control Delay (Average)	sec	14.4	14.4 sec
Control Delay (Worst Lane by MC)	sec	19.7	
Control Delay (Worst Movement by MC)	sec	28.9	28.9 sec
Geometric Delay (Average)	sec	6.0	
Stop-Line Delay (Average)	sec	8.4	
Idling Time (Average)	sec	1.8	
Intersection Level of Service (LOS)		LOS A	
95% Back of Queue - Veh (Worst Lane)	veh	22.9	
95% Back of Queue - Dist (Worst Lane)	m	162.2	
Ave. Que Storage Ratio (Worst Lane)		0.18	
Effective Stops (Total)	veh/h	1938	2325 pers/h
Effective Stop Rate		0.88	0.88
Proportion Queued		0.88	0.88
Performance Index		121.8	121.8
Cost (Total)	$/h	1767.16	1767.16 $/h
Fuel Consumption (Total)	L/h	202.8	
Carbon Dioxide (Total)	kg/h	478.3	
Hydrocarbons (Total)	kg/h	0.050	
Carbon Monoxide (Total)	kg/h	0.73	
NOx (Total)	kg/h	0.480	

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Intersection LOS value for Vehicles is based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand effects.
In Network analysis, Arrival Flows will be reduced if Upstream Capacity Constraint exists.

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

Site Model Variability Index (Average value of largest changes in Lane Degrees of Saturation from the third to the last Main (Timing-Capacity) Iterations): 5.6 %

Number of Iterations: 8 (Maximum: 10)

Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 2.6% 1.3% 0.7%

Intersection Performance - Annual Values			
Performance Measure	**Vehicles:**	**All MCs**	**Persons**
Demand Flows (Total)	veh/y	1,056,000	1,267,200 pers/y
Delay (Total)	veh-h/y	4,231	5,078 pers-h/y

Effective Stops (Total)	veh/y	930,130	1,116,157	pers/y
Travel Distance (Total)	veh-km/y	839,676	1,007,612	pers-km/y
Travel Time (Total)	veh-h/y	16,937	20,325	pers-h/y
Cost (Total)	$/y	848,237	848,237	$/y
Fuel Consumption (Total)	L/y	97,366		
Carbon Dioxide (Total)	kg/y	229,608		
Hydrocarbons (Total)	kg/y	24		
Carbon Monoxide (Total)	kg/y	353		
NOx (Total)	kg/y	230		

1 Hours per Year: 480 (Site)

INTERSECTION SUMMARY

Site: 101E [PM Future 2033 Weekday Peak 5:15pm - 6:15pm (Site Folder: Overall Avenue and Horse Park Drive)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

New Site
Site Category: (None)
Roundabout

Intersection Performance - Hourly Values				
Performance Measure	**Vehicles:**	**All MCs**	**Persons**	
Travel Speed (Average)	km/h	20.8	20.8	km/h
Travel Distance (Total)	veh-km/h	2126.3	2551.6	pers-km/h
Travel Time (Total)	veh-h/h	102.3	122.7	pers-h/h
Desired Speed	km/h	73.2		
Speed Efficiency		0.28		
Travel Time Index		2.05		
Congestion Coefficient		3.52		
Demand Flows (Total)	veh/h	2673	3207	pers/h
Arrival Flows (Total)	veh/h	2673		
Percent Heavy Vehicles (Demand)	%	1.4		
Percent Heavy Vehicles (Arrivals)	%	1.4		
Degree of Saturation		1.196		
Practical Spare Capacity	%	-29.0		
Effective Intersection Capacity	veh/h	2234		
Control Delay (Total)	veh-h/h	70.30	84.36	pers-h/h
Control Delay (Average)	sec	94.7	94.7	sec
Control Delay (Worst Lane by MC)	sec	193.0		
Control Delay (Worst Movement by MC)	sec	203.2	203.2	sec
Geometric Delay (Average)	sec	6.0		
Stop-Line Delay (Average)	sec	88.7		
Idling Time (Average)	sec	54.6		
Intersection Level of Service (LOS)		LOS F		
95% Back of Queue - Veh (Worst Lane)	veh	143.3		
95% Back of Queue - Dist (Worst Lane)	m	1014.8		
Ave. Que Storage Ratio (Worst Lane)		0.91		
Effective Stops (Total)	veh/h	6139	7367	pers/h
Effective Stop Rate		2.30	2.30	
Proportion Queued		0.94	0.94	
Performance Index		518.4	518.4	
Cost (Total)	$/h	4465.46	4465.46	$/h
Fuel Consumption (Total)	L/h	345.0		
Carbon Dioxide (Total)	kg/h	813.1		
Hydrocarbons (Total)	kg/h	0.089		
Carbon Monoxide (Total)	kg/h	0.98		
NOx (Total)	kg/h	0.734		

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Intersection LOS value for Vehicles is based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand effects.
In Network analysis, Arrival Flows will be reduced if Upstream Capacity Constraint exists.

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

Site Model Variability Index (Average value of largest changes in Lane Degrees of Saturation from the third to the last Main (Timing-Capacity) Iterations): 4.3 %

Number of Iterations: 8 (Maximum: 10)

Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 2.1% 1.1% 0.6%

Intersection Performance - Annual Values				
Performance Measure	**Vehicles:**	**All MCs**	**Persons**	
Demand Flows (Total)	veh/y	1,282,863	1,539,436	pers/y
Delay (Total)	veh-h/y	33,744	40,492	pers-h/y

Effective Stops (Total)	veh/y	2,946,848	3,536,218	pers/y
Travel Distance (Total)	veh-km/y	1,020,645	1,224,774	pers-km/y
Travel Time (Total)	veh-h/y	49,081	58,898	pers-h/y
Cost (Total)	$/y	2,143,419	2,143,419	$/y
Fuel Consumption (Total)	L/y	165,618		
Carbon Dioxide (Total)	kg/y	390,281		
Hydrocarbons (Total)	kg/y	43		
Carbon Monoxide (Total)	kg/y	471		
NOx (Total)	kg/y	353		

1 Hours per Year: 480 (Site)

MOVEMENT SUMMARY

Site: 101E [AM Base 2022 Weekday Peak 8:00am - 9:00am (Site Folder: Overall Avenue and Horse Park Drive)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival 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	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Horse Park Drive															
1	L2	All MCs	69	1.5	69	1.5	0.563	8.9	LOS A	4.7	33.9	0.74	0.69	0.80	37.8
2	T1	All MCs	422	4.7	422	4.7	0.563	9.5	LOS A	4.7	33.9	0.74	0.69	0.80	60.6
3	R2	All MCs	32	0.0	32	0.0	0.563	14.4	LOS A	4.7	33.9	0.74	0.69	0.80	41.3
3u	U	All MCs	1	0.0	1	0.0	0.563	17.0	LOS B	4.7	33.9	0.74	0.69	0.80	59.7
Approach			524	4.0	524	4.0	0.563	9.8	LOS A	4.7	33.9	0.74	0.69	0.80	56.6
East: Newlop Street															
4	L2	All MCs	72	2.9	72	2.9	0.247	16.7	LOS B	1.9	13.5	1.00	0.86	1.00	36.0
5	T1	All MCs	104	1.0	104	1.0	0.281	13.6	LOS A	2.6	18.3	1.00	0.85	1.00	30.2
6	R2	All MCs	12	0.0	12	0.0	0.281	18.5	LOS B	2.6	18.3	1.00	0.85	1.00	38.3
6u	U	All MCs	1	0.0	1	0.0	0.281	22.2	LOS B	2.6	18.3	1.00	0.85	1.00	32.8
Approach			188	1.7	188	1.7	0.281	15.1	LOS B	2.6	18.3	1.00	0.86	1.00	33.8
North: Horse Park Drive															
7	L2	All MCs	6	0.0	6	0.0	0.869	12.5	LOS A	16.6	119.1	0.98	0.81	1.24	51.8
8	T1	All MCs	743	3.3	743	3.3	0.869	13.1	LOS A	16.6	119.1	0.98	0.81	1.24	57.4
9	R2	All MCs	268	3.1	268	3.1	0.869	18.2	LOS B	16.6	119.1	0.98	0.81	1.24	48.3
Approach			1018	3.2	1018	3.2	0.869	14.4	LOS A	16.6	119.1	0.98	0.81	1.24	55.4
West: Overall Avenue															
10	L2	All MCs	126	4.2	126	4.2	0.355	4.8	LOS A	2.2	16.1	0.64	0.64	0.64	42.0
11	T1	All MCs	45	7.0	45	7.0	0.355	4.7	LOS A	2.2	16.1	0.64	0.64	0.64	36.4
12	R2	All MCs	185	1.1	185	1.1	0.355	9.4	LOS A	2.2	16.1	0.64	0.64	0.64	41.0
12u	U	All MCs	1	0.0	1	0.0	0.355	11.3	LOS A	2.2	16.1	0.64	0.64	0.64	16.1
Approach			358	2.9	358	2.9	0.355	7.2	LOS A	2.2	16.1	0.64	0.64	0.64	41.0
All Vehicles			2088	3.2	2088	3.2	0.869	12.1	LOS A	16.6	119.1	0.86	0.76	1.01	51.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 101E [AM Development 2023 Weekday Peak 8:00am - 9:00am (Site Folder: Overall Avenue and Horse Park Drive)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival 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	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Horse Park Drive															
1	L2	All MCs	83	2.5	83	2.5	0.604	9.7	LOS A	5.5	39.7	0.78	0.73	0.89	37.5
2	T1	All MCs	432	4.9	432	4.9	0.604	10.3	LOS A	5.5	39.7	0.78	0.73	0.89	60.2
3	R2	All MCs	33	0.0	33	0.0	0.604	15.2	LOS B	5.5	39.7	0.78	0.73	0.89	41.0
3u	U	All MCs	2	0.0	2	0.0	0.604	17.7	LOS B	5.5	39.7	0.78	0.73	0.89	59.3
Approach			549	4.2	549	4.2	0.604	10.5	LOS A	5.5	39.7	0.78	0.73	0.89	55.8
East: Newlop Street															
4	L2	All MCs	75	4.2	75	4.2	0.286	18.5	LOS B	2.2	15.8	1.00	0.88	1.00	35.1
5	T1	All MCs	107	2.0	107	2.0	0.335	15.0	LOS B	3.1	22.2	1.00	0.87	1.00	28.9
6	R2	All MCs	13	0.0	13	0.0	0.335	19.9	LOS B	3.1	22.2	1.00	0.87	1.00	37.4
6u	U	All MCs	7	0.0	7	0.0	0.335	23.6	LOS B	3.1	22.2	1.00	0.87	1.00	31.5
Approach			202	2.6	202	2.6	0.335	16.9	LOS B	3.1	22.2	1.00	0.88	1.00	32.6
North: Horse Park Drive															
7	L2	All MCs	7	0.0	7	0.0	0.912	15.9	LOS B	21.4	154.2	1.00	0.97	1.45	48.5
8	T1	All MCs	759	3.3	759	3.3	0.912	16.5	LOS B	21.4	154.2	1.00	0.97	1.45	54.4
9	R2	All MCs	279	3.4	279	3.4	0.912	21.6	LOS B	21.4	154.2	1.00	0.97	1.45	45.1
Approach			1045	3.3	1045	3.3	0.912	17.8	LOS B	21.4	154.2	1.00	0.97	1.45	52.3
West: Overall Avenue															
10	L2	All MCs	133	4.8	133	4.8	0.383	5.0	LOS A	2.5	18.0	0.67	0.65	0.67	41.9
11	T1	All MCs	47	8.9	47	8.9	0.383	4.9	LOS A	2.5	18.0	0.67	0.65	0.67	36.2
12	R2	All MCs	195	1.6	195	1.6	0.383	9.6	LOS A	2.5	18.0	0.67	0.65	0.67	40.9
12u	U	All MCs	2	0.0	2	0.0	0.383	11.5	LOS A	2.5	18.0	0.67	0.65	0.67	16.1
Approach			377	3.6	377	3.6	0.383	7.4	LOS A	2.5	18.0	0.67	0.65	0.67	40.8
All Vehicles			2174	3.5	2174	3.5	0.912	14.1	LOS A	21.4	154.2	0.89	0.85	1.13	49.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 101E [AM Future 2033 Weekday Peak 8:00am - 9:00am (Site Folder: Overall Avenue and Horse Park Drive)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival 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	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Horse Park Drive															
1	L2	All MCs	98	2.2	98	2.2	0.748	12.8	LOS A	9.3	67.2	0.91	0.85	1.20	35.7
2	T1	All MCs	525	4.8	525	4.8	0.748	13.5	LOS A	9.3	67.2	0.91	0.85	1.20	57.6
3	R2	All MCs	40	0.0	40	0.0	0.748	18.3	LOS B	9.3	67.2	0.91	0.85	1.20	39.2
3u	U	All MCs	2	0.0	2	0.0	0.748	20.9	LOS B	9.3	67.2	0.91	0.85	1.20	56.6
Approach			665	4.1	665	4.1	0.748	13.7	LOS A	9.3	67.2	0.91	0.85	1.20	53.4
East: Newlop Street															
4	L2	All MCs	91	3.5	91	3.5	0.403	26.6	LOS B	3.2	23.3	1.00	0.97	1.12	31.2
5	T1	All MCs	131	1.6	131	1.6	0.469	24.0	LOS B	4.8	34.0	1.00	0.99	1.18	23.5
6	R2	All MCs	15	0.0	15	0.0	0.469	28.8	LOS C	4.8	34.0	1.00	0.99	1.18	33.1
6u	U	All MCs	8	0.0	8	0.0	0.469	32.5	LOS C	4.8	34.0	1.00	0.99	1.18	26.2
Approach			244	2.2	244	2.2	0.469	25.5	LOS B	4.8	34.0	1.00	0.98	1.16	27.9
North: Horse Park Drive															
7	L2	All MCs	8	0.0	8	0.0	1.176	173.3	LOS F	139.9	1006.4	1.00	3.82	8.16	12.2
8	T1	All MCs	924	3.3	924	3.3	1.176	173.9	LOS F	139.9	1006.4	1.00	3.82	8.16	16.0
9	R2	All MCs	339	3.1	339	3.1	1.176	179.1	LOS F	139.9	1006.4	1.00	3.82	8.16	11.1
Approach			1272	3.2	1272	3.2	1.176	175.3	LOS F	139.9	1006.4	1.00	3.82	8.16	14.7
West: Overall Avenue															
10	L2	All MCs	160	4.6	160	4.6	0.523	6.7	LOS A	4.3	31.1	0.83	0.76	0.91	40.9
11	T1	All MCs	57	7.4	57	7.4	0.523	6.5	LOS A	4.3	31.1	0.83	0.76	0.91	34.8
12	R2	All MCs	236	1.3	236	1.3	0.523	11.3	LOS A	4.3	31.1	0.83	0.76	0.91	39.9
12u	U	All MCs	2	0.0	2	0.0	0.523	13.1	LOS A	4.3	31.1	0.83	0.76	0.91	15.7
Approach			455	3.2	455	3.2	0.523	9.1	LOS A	4.3	31.1	0.83	0.76	0.91	39.8
All Vehicles			2636	3.4	2636	3.4	1.176	92.0	LOS F	139.9	1006.4	0.95	2.28	4.50	21.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 101E [PM Base 2022 Weekday Peak 5:15pm - 6:15pm (Site Folder: Overall Avenue and Horse Park Drive)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival 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	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Horse Park Drive															
1	L2	All MCs	142	0.7	142	0.7	0.879	14.7	LOS B	17.3	122.3	1.00	0.89	1.39	34.7
2	T1	All MCs	748	1.3	748	1.3	0.879	15.2	LOS B	17.3	122.3	1.00	0.89	1.39	56.7
3	R2	All MCs	71	1.5	71	1.5	0.879	20.3	LOS B	17.3	122.3	1.00	0.89	1.39	48.3
Approach			961	1.2	961	1.2	0.879	15.5	LOS B	17.3	122.3	1.00	0.89	1.39	53.0
East: Newlop Street															
4	L2	All MCs	52	0.0	52	0.0	0.074	7.2	LOS A	0.5	3.2	0.74	0.67	0.74	42.4
5	T1	All MCs	93	0.0	93	0.0	0.108	5.7	LOS A	0.8	5.4	0.76	0.62	0.76	37.1
6	R2	All MCs	8	0.0	8	0.0	0.108	10.7	LOS A	0.8	5.4	0.76	0.62	0.76	42.7
Approach			153	0.0	153	0.0	0.108	6.5	LOS A	0.8	5.4	0.75	0.64	0.75	40.0
North: Horse Park Drive															
7	L2	All MCs	15	0.0	15	0.0	0.551	7.0	LOS A	4.4	31.5	0.61	0.61	0.61	56.0
8	T1	All MCs	426	1.2	426	1.2	0.551	7.5	LOS A	4.4	31.5	0.61	0.61	0.61	61.6
9	R2	All MCs	206	2.0	206	2.0	0.551	12.7	LOS A	4.4	31.5	0.61	0.61	0.61	52.4
Approach			647	1.5	647	1.5	0.551	9.2	LOS A	4.4	31.5	0.61	0.61	0.61	59.0
West: Overall Avenue															
10	L2	All MCs	191	2.2	191	2.2	0.567	10.1	LOS A	5.4	38.2	0.98	0.88	1.17	39.5
11	T1	All MCs	89	1.2	89	1.2	0.567	9.8	LOS A	5.4	38.2	0.98	0.88	1.17	32.6
12	R2	All MCs	83	0.0	83	0.0	0.567	14.7	LOS B	5.4	38.2	0.98	0.88	1.17	38.4
Approach			363	1.4	363	1.4	0.567	11.1	LOS A	5.4	38.2	0.98	0.88	1.17	38.1
All Vehicles			2124	1.2	2124	1.2	0.879	12.2	LOS A	17.3	122.3	0.86	0.79	1.07	51.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 101E [PM Development 2023 Weekday Peak 5:15pm - 6:15pm (Site Folder: Overall Avenue and Horse Park Drive)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival 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	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Horse Park Drive															
1	L2	All MCs	157	1.3	157	1.3	0.924	18.9	LOS B	22.9	162.2	1.00	1.07	1.63	32.4
2	T1	All MCs	765	1.4	765	1.4	0.924	19.4	LOS B	22.9	162.2	1.00	1.07	1.63	53.1
3	R2	All MCs	74	2.9	74	2.9	0.924	24.6	LOS B	22.9	162.2	1.00	1.07	1.63	44.4
Approach			996	1.5	996	1.5	0.924	19.7	LOS B	22.9	162.2	1.00	1.07	1.63	49.3
East: Newlop Street															
4	L2	All MCs	53	0.0	53	0.0	0.079	7.4	LOS A	0.5	3.5	0.76	0.68	0.76	42.2
5	T1	All MCs	95	0.0	95	0.0	0.115	6.0	LOS A	0.8	5.8	0.78	0.63	0.78	36.9
6	R2	All MCs	9	0.0	9	0.0	0.115	11.0	LOS A	0.8	5.8	0.78	0.63	0.78	42.5
Approach			157	0.0	157	0.0	0.115	6.8	LOS A	0.8	5.8	0.77	0.65	0.77	39.8
North: Horse Park Drive															
7	L2	All MCs	16	0.0	16	0.0	0.576	7.2	LOS A	4.8	34.0	0.64	0.62	0.64	55.8
8	T1	All MCs	436	1.4	436	1.4	0.576	7.7	LOS A	4.8	34.0	0.64	0.62	0.64	61.3
9	R2	All MCs	216	2.4	216	2.4	0.576	12.9	LOS A	4.8	34.0	0.64	0.62	0.64	52.2
Approach			667	1.7	667	1.7	0.576	9.4	LOS A	4.8	34.0	0.64	0.62	0.64	58.8
West: Overall Avenue															
10	L2	All MCs	198	2.7	198	2.7	0.616	11.7	LOS A	6.2	44.4	1.00	0.93	1.25	38.5
11	T1	All MCs	93	2.3	93	2.3	0.616	11.4	LOS A	6.2	44.4	1.00	0.93	1.25	31.1
12	R2	All MCs	89	0.0	89	0.0	0.616	16.2	LOS B	6.2	44.4	1.00	0.93	1.25	37.3
Approach			380	1.9	380	1.9	0.616	12.7	LOS A	6.2	44.4	1.00	0.93	1.25	37.0
All Vehicles			2200	1.5	2200	1.5	0.924	14.4	LOS A	22.9	162.2	0.88	0.88	1.21	49.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 101E [PM Future 2033 Weekday Peak 5:15pm - 6:15pm (Site Folder: Overall Avenue and Horse Park Drive)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival 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	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Horse Park Drive															
1	L2	All MCs	188	1.1	188	1.1	1.196	192.2	LOS F	143.3	1014.8	1.00	4.05	9.18	8.8
2	T1	All MCs	932	1.4	932	1.4	1.196	192.7	LOS F	143.3	1014.8	1.00	4.05	9.18	14.8
3	R2	All MCs	89	2.4	89	2.4	1.196	197.9	LOS F	143.3	1014.8	1.00	4.05	9.18	10.4
Approach			1209	1.4	1209	1.4	1.196	193.0	LOS F	143.3	1014.8	1.00	4.05	9.18	13.5
East: Newlop Street															
4	L2	All MCs	64	0.0	64	0.0	0.123	9.4	LOS A	0.9	6.0	0.88	0.75	0.88	40.7
5	T1	All MCs	116	0.0	116	0.0	0.177	7.6	LOS A	1.4	10.1	0.92	0.71	0.92	35.8
6	R2	All MCs	11	0.0	11	0.0	0.177	12.6	LOS A	1.4	10.1	0.92	0.71	0.92	41.9
Approach			191	0.0	191	0.0	0.177	8.5	LOS A	1.4	10.1	0.91	0.72	0.91	38.6
North: Horse Park Drive															
7	L2	All MCs	19	0.0	19	0.0	0.724	9.3	LOS A	8.7	61.8	0.81	0.71	0.92	54.3
8	T1	All MCs	532	1.4	532	1.4	0.724	9.8	LOS A	8.7	61.8	0.81	0.71	0.92	60.0
9	R2	All MCs	261	2.0	261	2.0	0.724	15.0	LOS B	8.7	61.8	0.81	0.71	0.92	50.7
Approach			812	1.6	812	1.6	0.724	11.4	LOS A	8.7	61.8	0.81	0.71	0.92	57.4
West: Overall Avenue															
10	L2	All MCs	240	2.2	240	2.2	0.774	17.9	LOS B	10.0	70.6	1.00	1.14	1.55	34.8
11	T1	All MCs	113	1.9	113	1.9	0.774	17.6	LOS B	10.0	70.6	1.00	1.14	1.55	26.4
12	R2	All MCs	108	0.0	108	0.0	0.774	22.4	LOS B	10.0	70.6	1.00	1.14	1.55	33.6
Approach			461	1.6	461	1.6	0.774	18.9	LOS B	10.0	70.6	1.00	1.14	1.55	33.1
All Vehicles			2673	1.4	2673	1.4	1.196	94.7	LOS F	143.3	1014.8	0.94	2.30	4.77	20.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.