

**AN AMENDED TRAFFIC AND PARKING IMPACTS REPORT
FOR A DEVELOPMENT APPLICATION
FOR A PROPOSED AFFORDABLE HOUSING DEVELOPMENT
AT NO. 30-38 IRONBARK AVENUE, CASULA NSW 2170**

Property address	30-38 Ironbark Avenue, Casula NSW 2170
Client	SGCH
Prepared by	O. Sannikov, MEngSc (Traffic Engineering), MIEAust, PEng, FAITPM
Date	02/07/2019
Job No.	18052
Report No.	18052 Rep 02 (updated on-street parking analysis)

Item	Report
Site location	Refer to Figure 1.
Existing land use	Five (5) single storey residential dwellings
Proposed development	- Affordable housing development comprising 63 residential apartments in total including 15 one bedroom units 48 two bedroom units - Ground level car park 30 car parking spaces including 7 car spaces for people with disabilities

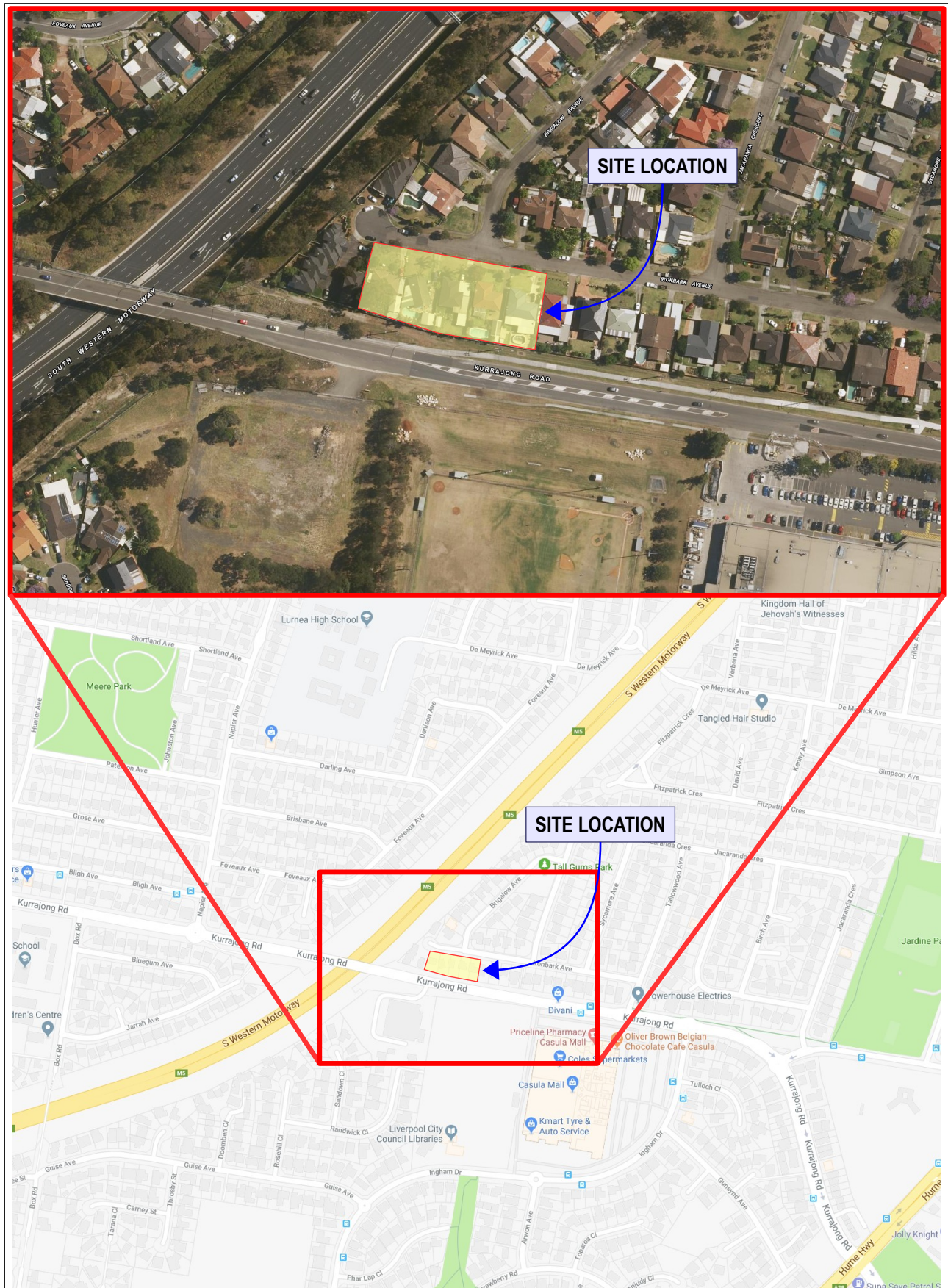


Figure 1. Site location.

Item	Report
	Existing traffic and parking situation
Street characteristics	- Refer to Figure 2. - The main roads bounding the proposed development are described below. - Ironbark Avenue - Local Road 2 travel lanes and parking opportunities on both sides of the street - South Western Motorway - State Road (MR 6005) 6 travel lanes and no parking lanes - Kurrajong Road - Regional Road (MR 7263) 2 travel lanes and no parking lanes - Tallowwood Avenue - Local road 2 travel lanes and parking opportunities on both sides of the street - Ingham Drive - Collector Road 2 travel lanes and parking opportunities on both sides of the street - Other streets in the surrounding area are local/local collector roads. Street conditions are typical for a residential area, with low to moderate traffic volumes. - General speed limit is 50 km/h on local streets around the site.
On-street parking availability	- On-street parking is available on Ironbark Avenue and on nearby streets such as Jacaranda Crescent, Sycamore Avenue, Tallowwood Avenue and Brigalow Avenue. - There are unrestricted car parking opportunities across all streets.
	Public Transport
Bus	- The site is located approximately 350 metres from bus stops along Kurrajong Road. - Refer to Figure 3. - Bus Route 851 - Liverpool to Carnes Hill Marketplace via Cowpasture Rd 2 services operate during the morning peak and services operate approximately every 30 minutes during the afternoon peak. - Carnes Hill Marketplace to Liverpool via Cowpasture Rd 4 services operate during both morning and afternoon peaks. - Bus Route 852 - Liverpool to Carnes Hill Marketplace via Greenway Dr & Cowpasture Rd 5 services operate during the morning peak in both directions - Services operates approximately every 30 minutes during the afternoon peak in both directions. - Bus Route 865 - Liverpool to Casula via Lurnea Shops - Services operate approximately every 30-40 minutes during both morning and afternoon peaks in both directions. - Bus Route 866 - Liverpool to Casula - Services operate approximately every 30-40 minutes during both morning and afternoon peaks in both directions.



Figure 2. Street characteristics.

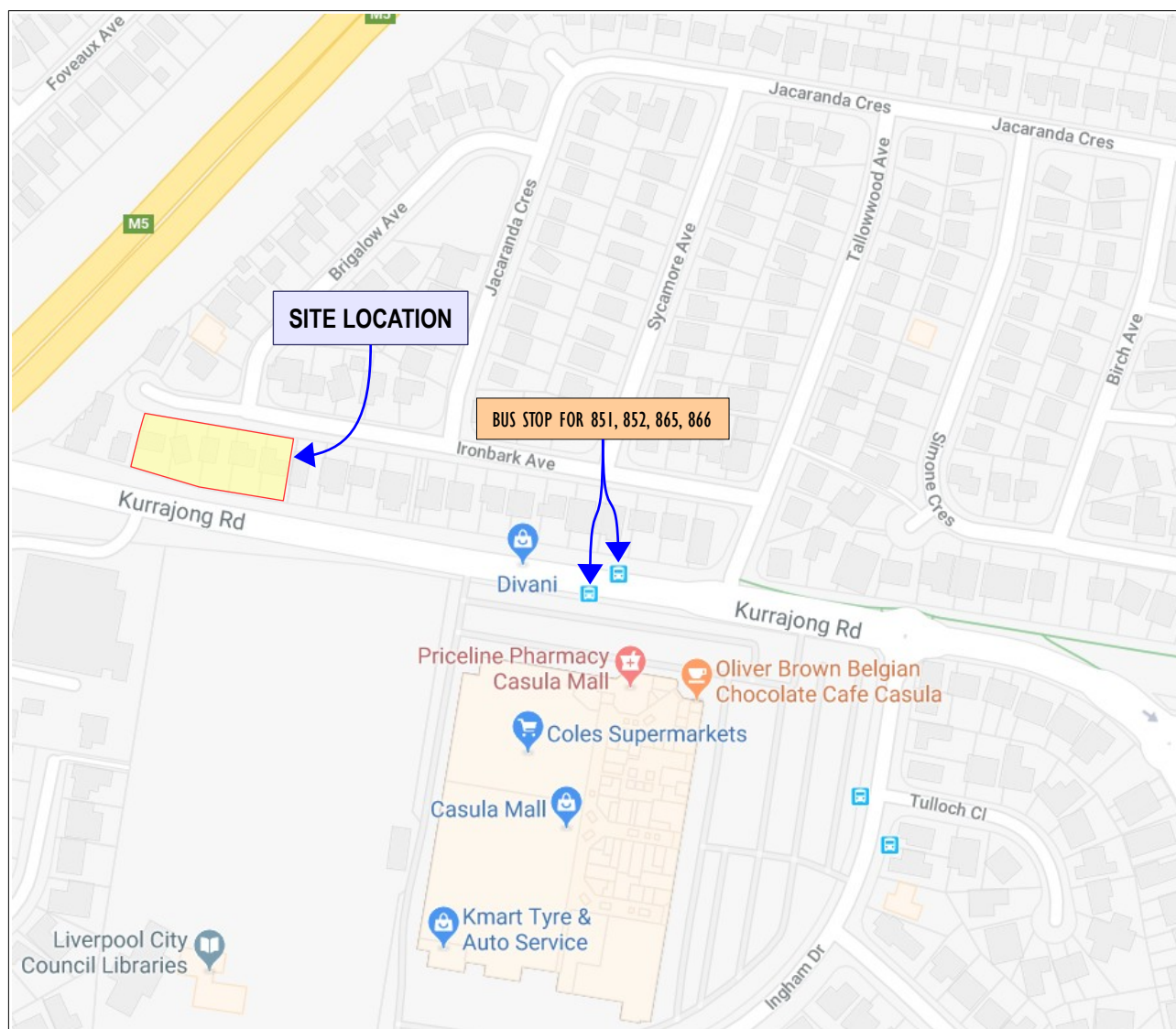


Figure 3. Public transport – bus stops.

Item	Report
	Surveys and survey results
Parking survey	- A parking demand survey was conducted on Thursday the 10th of May 2018 and Friday the 11th of April 2018 - The morning survey was between 6:30 a.m. and 9:30 a.m. - The afternoon survey was between 3:00 p.m. and 7:00 p.m. - Refer to Figure 4 for survey locations - Areas in red represent a walking distance of up to 150 metres from the site location - Areas in blue represent a walking distance of 150 – 250 metres from the site location. - The following analysis now conservatively assumes that only 70% of the full kerb length parking on both sides of the street is available as opposed to 100% in the first version of the report. The result still demonstrate ample parking opportunities as detailed below.
Survey results	- Refer to Table 1 for survey results - Area 1a-1b (Ironbark Ave on the same side as the proposed development) - The morning peak occurred from 6:30 a.m. to 7:00 a.m. - The afternoon peak occurred at 3:00 p.m. and from 4:00 p.m. to 5:30 p.m. - The survey results indicated that there were at least 14 spaces vacant throughout the day (to a maximum of 16) in the survey area. - Area 1c-1e (Ironbark Ave on the opposite side of the proposed development) - The morning peak occurred from 6:30 a.m. to 7:00 a.m. and from 8:00 a.m. to 9:00 a.m. - The afternoon peak occurred at 3:00 p.m. and from 4:30 p.m. to 5:00 p.m. - The survey results indicated that there were at least 8 spaces vacant throughout the day (to a maximum of 11) in the survey area. - Area 2a-6 (all other areas) - The morning peak occurred from 8:00 a.m. to 9:30 a.m. - The afternoon peak occurred at 7:00 p.m. - The survey results indicated that there were at least 54 spaces vacant throughout the day (to a maximum of 62) in the survey area. - There are ample parking opportunities in the surrounding streets.

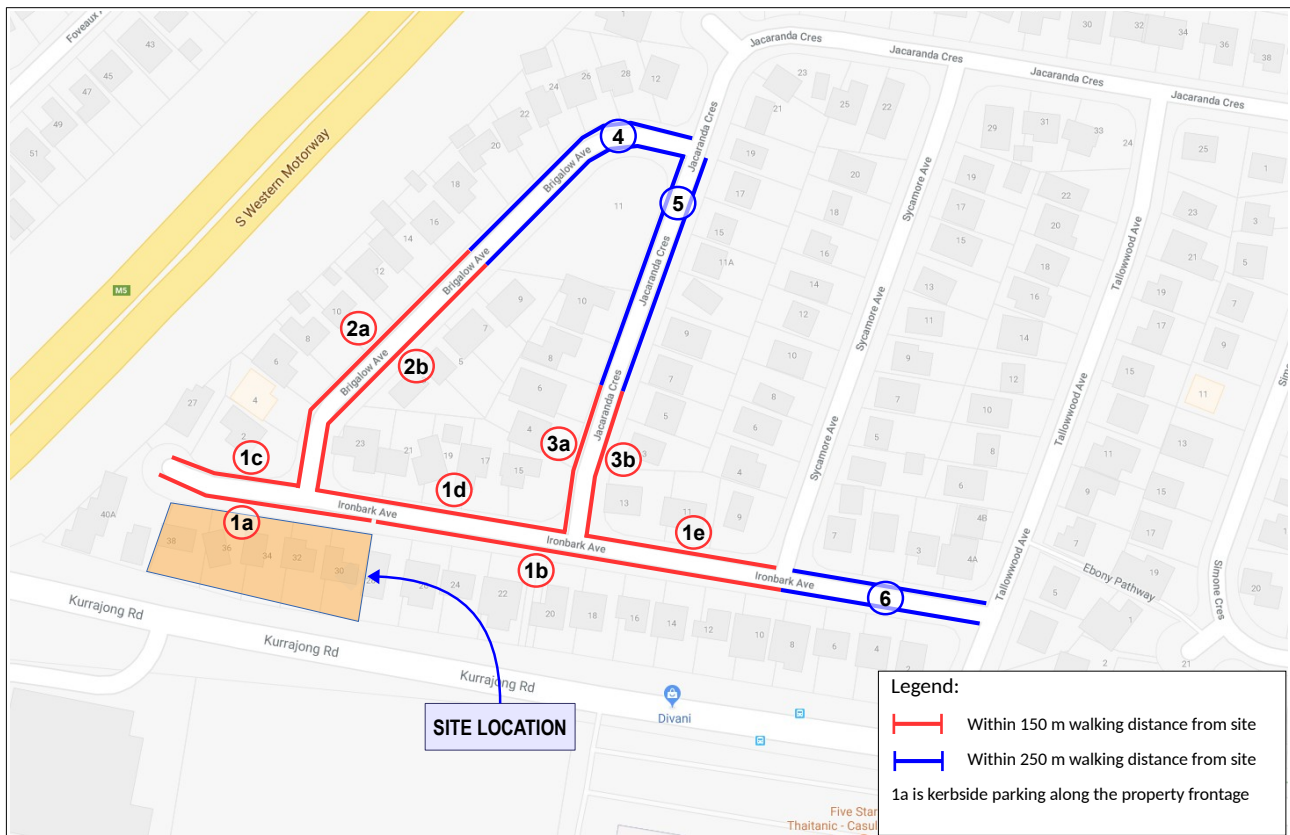


Figure 4. Parking survey locations.

Table 1. Parking survey results.

	Number of parked cars												Total		
	Parking Location														
Time	1a	1b	1c	1d	1e	2a	2b	3a	3b	4	5	6	1a-1b	1c-1e	2a-6
6:30	3	3	2	3	0	0	2	1	0	3	2	0	6	5	8
7:00	3	3	2	3	0	0	2	0	0	2	2	0	6	5	6
7:30	2	3	1	3	0	0	2	0	1	2	2	0	5	4	7
8:00	2	3	2	3	0	0	2	0	2	3	2	0	5	5	9
8:30	2	3	2	3	0	0	2	0	2	3	2	0	5	5	9
9:00	2	3	2	3	0	0	2	0	2	3	2	0	5	5	9
9:30	2	3	2	1	0	0	2	1	1	3	2	0	5	3	9
15:00	3	3	1	4	1	0	0	0	0	2	1	1	6	6	4
15:30	3	1	1	3	0	0	0	0	0	2	1	0	4	4	3
16:00	3	3	1	4	0	0	3	0	0	1	1	0	6	5	5
16:30	3	3	1	5	0	0	3	0	0	2	1	1	6	6	7
17:00	3	3	1	5	0	0	3	0	0	3	1	1	6	6	8
17:30	3	3	1	3	0	0	1	0	0	3	2	0	6	4	6
18:00	3	2	1	3	0	0	2	0	0	4	2	0	5	4	8
18:30	3	2	1	4	0	0	2	0	0	4	2	1	5	5	9
19:00	3	2	1	4	0	0	2	0	0	4	4	1	5	5	11
No of spaces	6	14	3	6	5	9	8	4	4	16	14	11	20	14	65

	Number of vacant parking spaces												Total		
	Parking Location														
Time	1a	1b	1c	1d	1e	2a	2b	3a	3b	4	5	6	1a-1b	1c-1e	2a-6
6:30	3	11	1	3	5	9	6	3	4	13	12	11	14	9	57
7:00	3	11	1	3	5	9	6	4	4	14	12	11	14	9	59
7:30	4	11	2	3	5	9	6	4	3	14	12	11	15	10	58
8:00	4	11	1	3	5	9	6	4	2	13	12	11	15	9	56
8:30	4	11	1	3	5	9	6	4	2	13	12	11	15	9	56
9:00	4	11	1	3	5	9	6	4	2	13	12	11	15	9	56
9:30	4	11	1	5	5	9	6	3	3	13	12	11	15	11	56
15:00	3	11	2	2	4	9	8	4	4	14	13	10	14	8	61
15:30	3	13	2	3	5	9	8	4	4	14	13	11	16	10	62
16:00	3	11	2	2	5	9	5	4	4	15	13	11	14	9	60
16:30	3	11	2	1	5	9	5	4	4	14	13	10	14	8	58
17:00	3	11	2	1	5	9	5	4	4	13	13	10	14	8	57
17:30	3	11	2	3	5	9	7	4	4	13	12	11	14	10	59
18:00	3	12	2	3	5	9	6	4	4	12	12	11	15	10	57
18:30	3	12	2	2	5	9	6	4	4	12	12	10	15	9	56
19:00	3	12	2	2	5	9	6	4	4	12	10	10	15	9	54

Item	Report			
Intersection traffic volume counts	Traffic counts			
	Location / type of control	Ironbark Avenue / Tallowwood Avenue (T-intersection)		
		Tallowwood Avenue / Kurrajong Road (T-intersection)		
		Kurrajong Road / Ingham Drive (roundabout)		
	Date / Day of the week	Thursday 10 th May 2018 (PM) to Friday 11 th May 2018 (AM)		
	Time period (AM)	06:30 to 09:30; peak hour occurred at 08:15–09:15		
	Time period (PM)	15:00 to 19:00; peak hour occurred at 16:45-17:45		
	Refer to Figure 5.			
Intersection operation	- SIDRA Intersection 7.0 software was used to check the intersection performance - Results of the SIDRA modelling determined the following: - Ironbark Avenue / Tallowwood Avenue intersection operates at a good Level of Service (LoS A) during both the morning and afternoon peak hours. - Tallowwood Avenue / Kurrajong Road intersection operates at a good Level of Service (LoS A) during the morning peak hour and at a good/satisfactory Level of Service (LoS B) during the afternoon peak hour. - Kurrajong Road / Ingham Drive intersection operates at a good Level of Service (LoS A) during both the morning and afternoon peak hours. - refer to Appendix A for detailed results - refer to RMS (RTA) Level of Service definitions below			
	Level of service criteria for intersections			
	Level of Service	Average Delay per Vehicle (secs/veh)	Traffic Signals, Roundabout	Give Way & Stop Signs
	A	< 14	Good operation	Good operation
	B	15 to 28	Good with acceptable delays & spare capacity	Acceptable delays & spare capacity
	C	29 to 42	Satisfactory	Satisfactory, but accident study required
	D	43 to 56	Operating near capacity	Near capacity & accident study required
E	57 to 70	At capacity; at signals, incidents will cause excessive delays; Roundabouts require other control mode	At capacity, requires other control mode	

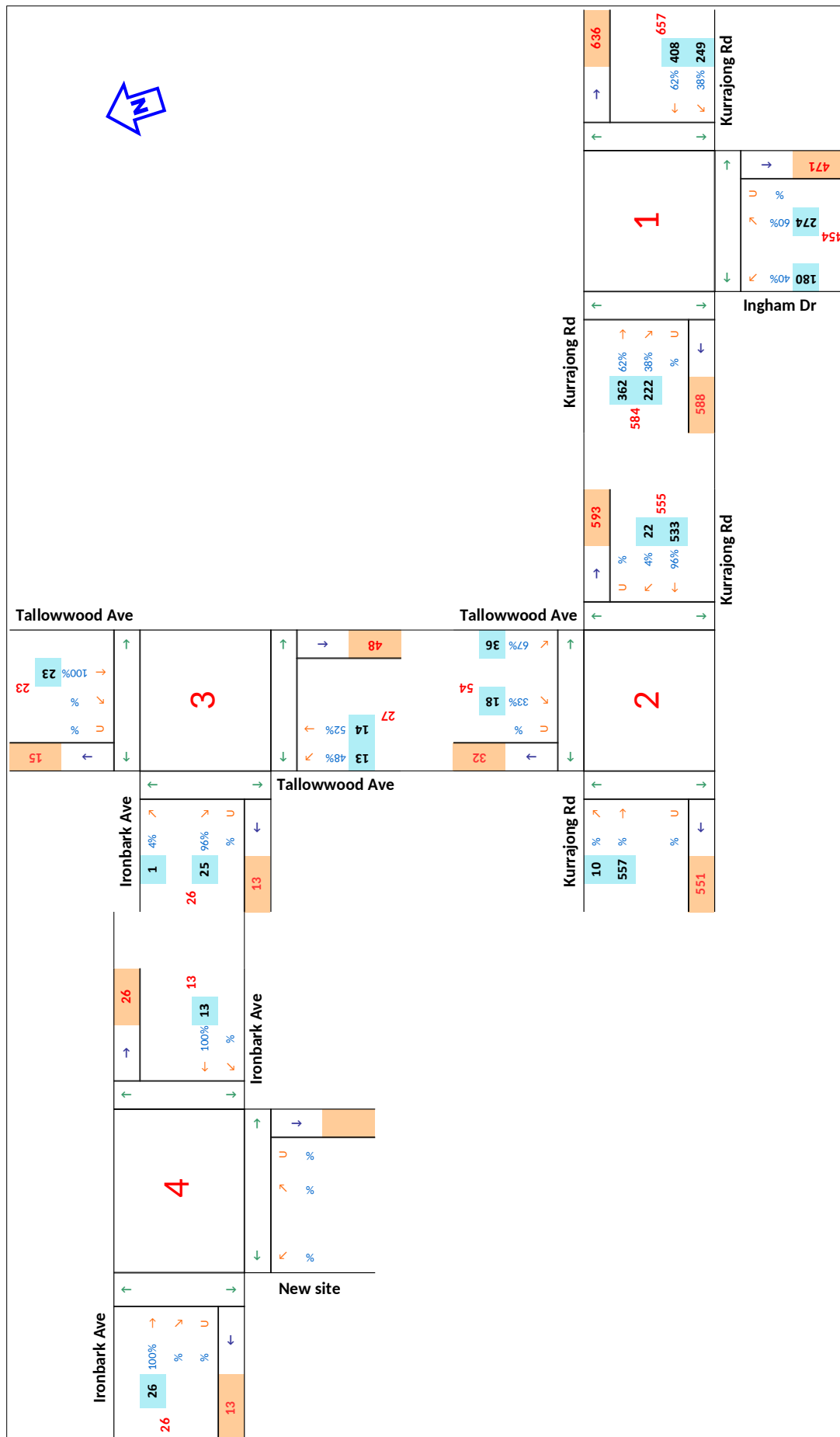


Figure 5a. Existing Traffic Volumes - morning peak

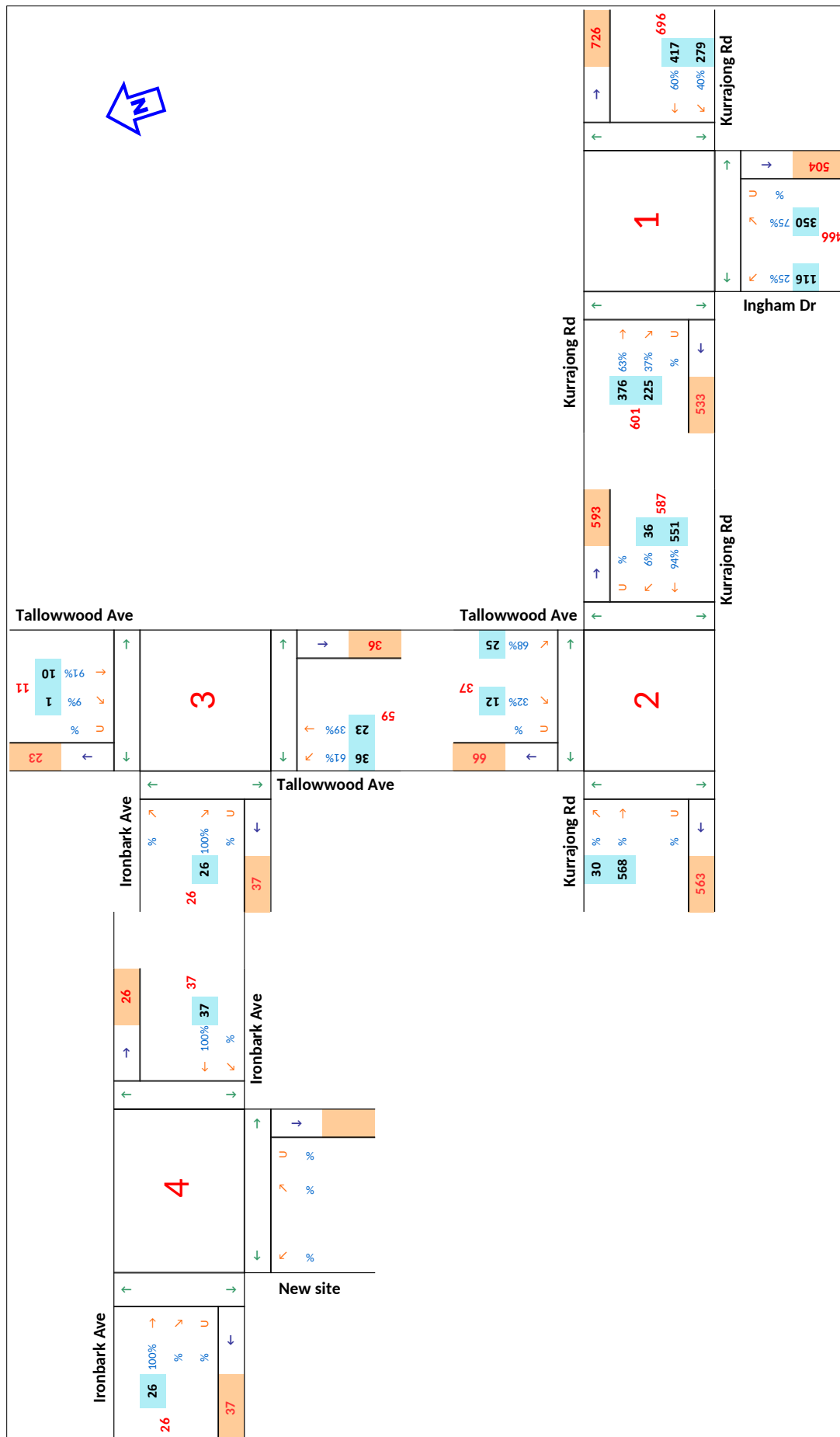


Figure 5b. Existing Traffic Volumes - afternoon peak

Item	Report																
Planning control document 1	- State Environmental Planning Policy (Affordable Rental Housing) 2009 (AHSEPP 2009) - Division 1 – In-fill affordable housing																
	<table> <tr> <th>Requirement</th><th>Compliance</th></tr> <tr> <td colspan="2">SEPP (Affordable Rental Housing) 2009 (AHSEPP)</td></tr> <tr> <td colspan="2">The proposed development is classified under Division 1 In-fill affordable housing</td></tr> <tr> <td colspan="2"> Clause 10 Development to which Division applies i. This Division applies to development for the purposes of dual occupancies, multi dwelling housing or residential flat buildings if: (a) the development concerned is permitted with consent under another environmental planning instrument, and (b) the development is on land that does not contain a heritage item that is identified in an environmental planning instrument, or an interim heritage order or on the State Heritage Register under the Heritage Act 1977. ii. Despite subclause (1), this Division does not apply to development on land in the Sydney region unless all or part of the development is within an accessible area. iii. Despite subclause (1), this Division does not apply to development on land that is not in the Sydney region unless all or part of the development is within 400 metres walking distance of land within Zone B2 Local Centre or Zone B4 Mixed Use, or within a land use zone that is equivalent to any of those zones. Clause 14 Standards that cannot be used to refuse consent (2) General A consent authority must not refuse consent to development to which this Division applies on any of the following grounds: (i) in the case of a development application made by a social housing provider for development on land in an accessible area—at least 0.4 parking spaces are provided for each dwelling containing 1 bedroom, at least 0.5 parking spaces are provided for each dwelling containing 2 bedrooms and at least 1 parking space is provided for each dwelling containing 3 or more bedrooms The applicant SGCH is a registered Tier 1 Community Housing Provider (social housing provider). Furthermore, the proposed development is within 400 metres walking distance of a bus stop used by a regular bus service (within the meaning of the Passenger Transport Act 1990) and is therefore in an accessible area. </td></tr> <tr> <td>Car parking required:</td><td>Car parking provided:</td></tr> <tr> <td>0.4 spaces per 1 bedroom 0.4 x 15 = 6 spaces </td><td>Total of 30 spaces</td></tr> <tr> <td>0.5 spaces per 2 bedroom 0.5 x 48 = 24 spaces </td><td>Complies with Division 1 AHSEPP requirements</td></tr> <tr> <td>Total parking spaces required 6 + 24 = 30 spaces </td><td></td></tr> </table>	Requirement	Compliance	SEPP (Affordable Rental Housing) 2009 (AHSEPP)		The proposed development is classified under Division 1 In-fill affordable housing		Clause 10 Development to which Division applies i. This Division applies to development for the purposes of dual occupancies, multi dwelling housing or residential flat buildings if: (a) the development concerned is permitted with consent under another environmental planning instrument, and (b) the development is on land that does not contain a heritage item that is identified in an environmental planning instrument, or an interim heritage order or on the State Heritage Register under the Heritage Act 1977. ii. Despite subclause (1), this Division does not apply to development on land in the Sydney region unless all or part of the development is within an accessible area. iii. Despite subclause (1), this Division does not apply to development on land that is not in the Sydney region unless all or part of the development is within 400 metres walking distance of land within Zone B2 Local Centre or Zone B4 Mixed Use, or within a land use zone that is equivalent to any of those zones. Clause 14 Standards that cannot be used to refuse consent (2) General A consent authority must not refuse consent to development to which this Division applies on any of the following grounds: (i) in the case of a development application made by a social housing provider for development on land in an accessible area—at least 0.4 parking spaces are provided for each dwelling containing 1 bedroom, at least 0.5 parking spaces are provided for each dwelling containing 2 bedrooms and at least 1 parking space is provided for each dwelling containing 3 or more bedrooms The applicant SGCH is a registered Tier 1 Community Housing Provider (social housing provider). Furthermore, the proposed development is within 400 metres walking distance of a bus stop used by a regular bus service (within the meaning of the Passenger Transport Act 1990) and is therefore in an accessible area.		Car parking required:	Car parking provided:	0.4 spaces per 1 bedroom 0.4 x 15 = 6 spaces	Total of 30 spaces	0.5 spaces per 2 bedroom 0.5 x 48 = 24 spaces	Complies with Division 1 AHSEPP requirements	Total parking spaces required 6 + 24 = 30 spaces	
Requirement	Compliance																
SEPP (Affordable Rental Housing) 2009 (AHSEPP)																	
The proposed development is classified under Division 1 In-fill affordable housing																	
Clause 10 Development to which Division applies i. This Division applies to development for the purposes of dual occupancies, multi dwelling housing or residential flat buildings if: (a) the development concerned is permitted with consent under another environmental planning instrument, and (b) the development is on land that does not contain a heritage item that is identified in an environmental planning instrument, or an interim heritage order or on the State Heritage Register under the Heritage Act 1977. ii. Despite subclause (1), this Division does not apply to development on land in the Sydney region unless all or part of the development is within an accessible area. iii. Despite subclause (1), this Division does not apply to development on land that is not in the Sydney region unless all or part of the development is within 400 metres walking distance of land within Zone B2 Local Centre or Zone B4 Mixed Use, or within a land use zone that is equivalent to any of those zones. Clause 14 Standards that cannot be used to refuse consent (2) General A consent authority must not refuse consent to development to which this Division applies on any of the following grounds: (i) in the case of a development application made by a social housing provider for development on land in an accessible area—at least 0.4 parking spaces are provided for each dwelling containing 1 bedroom, at least 0.5 parking spaces are provided for each dwelling containing 2 bedrooms and at least 1 parking space is provided for each dwelling containing 3 or more bedrooms The applicant SGCH is a registered Tier 1 Community Housing Provider (social housing provider). Furthermore, the proposed development is within 400 metres walking distance of a bus stop used by a regular bus service (within the meaning of the Passenger Transport Act 1990) and is therefore in an accessible area.																	
Car parking required:	Car parking provided:																
0.4 spaces per 1 bedroom 0.4 x 15 = 6 spaces	Total of 30 spaces																
0.5 spaces per 2 bedroom 0.5 x 48 = 24 spaces	Complies with Division 1 AHSEPP requirements																
Total parking spaces required 6 + 24 = 30 spaces																	

Item	Report
Planning control document	- Liverpool Development Control Plan 2008 - Part 1 – General controls for all development - Liverpool Local Environmental Plan 2008

Building design (car parking)

Requirement	Compliance
-------------	------------

Section 20. Car Parking and Access

20.1 Overall Design Considerations

The layout of a car parking area shall consider the entire facility, including car parking modules, landscaping, circulation aisles and roadways, access driveways and, if necessary, frontage road access as an integrated coordinated design. The management of traffic within a car parking facility should take into account:

- | | |
|---|----------|
| 1. The need for traffic to move to and from the frontage road with minimum disruption to passing traffic and maximum pedestrian safety. | Complies |
| 2. Provision of adequate capacity in circulation roadways and aisles to handle peak hour movements without congestion. | Complies |
| 3. Avoid as far as practicable conflicts between intersecting streams of circulating traffic. | Complies |
| 4. Minimum length travel paths between entry/exit points and car parking spaces. | Complies |

20.2 Car Parking Provision and Service Facilities by Land Use

1. Tables 12 and 13 outline the number of car parking spaces and any other facilities required for the accommodation of vehicles on site for each land use type. In proposals where calculations of car parking requirements result in fractions of spaces being required, the fraction will be rounded up to the nearest whole space. Where developments comprise separately defined facilities, for example a hotel with a restaurant; the relevant requirements of each facility must be satisfied.	Refer to the previous section, State Environmental Planning Policy (Affordable Rental Housing) 2009 (AHSEPP 2009) as it overrides DCP requirements for car parking rates and calculations.
--	--

20.3 Car Parking Design

Car space dimensions (refer to Table 14 below) Complies

Table 14. Car space dimensions of off-street car parking bays at 90°

Land use types	Width	Length 1	Length 2	Aisle Width
Tenant, employee and commuter car parking, universities (generally all day car parking)	2.4m	5.4m	4.8m	6.2m
Long-term city and town centre car parking, sport facilities, entertainment centres, hotels, motels, airport visitors (generally medium term car parking)	2.5m	5.4m	4.8m	5.8m
Short-term city and town centre car parking, shopping centres, department stores, supermarkets, hospitals and medical centres (generally short term car parking and where children and goods can be expected to be loaded into vehicles)	2.6m	5.4m	4.8m	5.8m
Car parking for people with disabilities (see next section)	3.2m	5.4m	4.8m	5.8m

Item	Report	
	Requirement	Compliance
	20.4 Internal Driveways	
	Gradient	
	1. Driveways are to be in accordance with the relevant Australian Standard. The maximum change in gradient is to be as shown in the "Maximum Gradients of Internal Driveway" diagram (See Figure 3).	Complies
	2. Measured parallel to the angle of car parking in 20 (5%); and	Complies
	3. Measured at 90° to the angle of car parking – in 16 (6.25%).	Complies
	Widths	
	1. For internal driveways between the access driveway and the car parking area the minimum carriageway width depends on the number of car parking spaces and service bays served.	Complies
	2. Consideration should be given to increase these widths where high levels of heavy vehicles usage are anticipated.	Complies
	3. By definition circulation driveways should not have car parking on them.	Complies
	4. The minimum internal driveway widths are to be provided in accordance with Table 4.	Complies

Table 15. Minimum internal driveway widths

Table 15 Internal driveway widths

	Number of Car Parking Spaces / Service Bays		
	1 - 15 spaces and length not exceeding 40m	15 - 40 spaces	Over 40 spaces
Width	3.5m	5m	6 - 6.5m

Design

1. Locate and design car-parking areas so they can be observed by adjoining uses.	Complies
2. Minimise the number of pedestrian and vehicular entry and exit points, and ensure they are in close proximity to each other and to nearby active uses.	Complies
3. Staff car parking areas should be separated and secured.	Complies
4. Provide surveillance measures such as security cameras or devices and security guards where possible.	Complies
8. Pedestrian pathways should be integrated into the design and allow for maximum safety, especially for people with a disability and people using prams. Pathways should be clearly marked and well lit.	Complies
9. Internal driveway should be designed for a low speed environment.	Complies

20.5 Driveways Crossings

Location of Driveway Crossings

Item	Report
	Requirement Compliance
	1. Driveway Crossings shall be located a minimum distance from the following items: - 0.5m from all drainage structures on the kerb and gutter; - 1.0m from side property boundaries; - 6m from a kerb tangent point of a street corner.
	2. Driveway Crossings should where possible avoid the need to remove existing street trees.
	3. Driveway Crossings should where possible avoid changes to existing public utility infrastructure including drainage and any relocation of such shall be the development's expense.
	4. Where a development site has frontage to a Classified Road, the Driveway Crossings should be located on an alternative street.
	5. Where a Driveway Crossing is proposed directly from a Classified Road, a deceleration lane may be required.
	6. Locate the entrance at the first Driveway Crossing from the adjacent kerbside lane.
	7. Avoid a driveway layout, which may result in on-street queuing.
	8. All vehicles must enter and leave the property in a forward direction (except in the case of dwelling houses and Attached dwellings and Semi detached dwellings)
	9. Locate each Driveway Crossing so that it is clear of all obstructions, e.g. poles, trees, which may prevent drivers from having a timely view of pedestrians.
	Design of Driveway Crossings
	1. Design each Driveway Crossing so that it is relatively level within 6m of the site boundary or any pedestrian way, the recommended maximum gradient is 5%.
	2. Signpost each Driveway Crossing with appropriate entry, exit and keep left signs.
	3. Decorative Driveway Crossings over the footpath area will only be permitted if it is compatible with the amenity of the locality.
	4. In business zones any Driveway Crossing shall be compatible with the existing and future paving pattern.
	Width of Driveway Crossings
	1. Driveway crossing widths shall be in accordance with tables 5 and 6.

Table 16 Car Parking Spaces served by the Driveway Type

Street Frontage	Number of Car Parking Spaces served by the Driveway Type					
	Less than 25	25-100	101-300	301-600	More than 600	Heavy Vehicles
Major	1-2	2-3	3-4	4	5	7
Minor	1	1-2	2-3	3-4	4	6

Item	Report
	Requirement

2. Major Street Frontage includes Classified Roads and Sub Arterial Roads under Council's Road Hierarchy.

Complies

Table 17 Driveway crossing widths

Type	Entry Width	Exit Width	Minimum separation of driveways	Splay at kerb line	Kerb return turnout radius
	W	W		S	R
1	3 – m	Combined	NA	0.5m	-
2	6 – 9m	Combined	NA	1m	-
3	6m	4 – 6 m	1 - 3m	1m	2 – 9m
4	6 – 8m	6 – 8 m	1 - 3m	1m	2 – 9m
5	Direct feed from a controlled intersection via a public street				
6	8 – 10m	8 – 10m	3m	1m	2 – 9m
7	10 – 12m	10 – 12m	3m	1m	2 – 9m

Item	Report
	Traffic impacts
Traffic generation	- Base traffic generation rates - From RMS (2002) Guide to Traffic Generating Developments - Updated statistics from TDT 2013 / 04a - High density residential developments - AM peak – 0.19 trips per unit 26 % in and 74 % out - PM peak - 0.15 trips per unit 66% in and 34% out Existing traffic generation - Dwelling houses - day peak hour vehicle trips = 0.99 per dwelling $0.99 \times 5 = 4.95$ one way trips, say 5 one way trips Traffic generated by proposed development - Refer to Figure 6. - High density residential development - Morning peak $0.19 \times 63 = 11.97$, say 12 trips (in + out) $12 \times 26\% = 3.11$, say 3 trips in $12 \times 74\% = 8.86$, say 9 trips out - Afternoon peak $0.15 \times 63 = 9.45$, say 9 trips (in+out) $9 \times 66\% = 6.24$, say 6 trips in $9 \times 34\% = 3.21$, say 3 trips out
Traffic distribution	- Trip generation and attraction is assumed to be equal in all directions, with trip distribution taking into account the surrounding street network, connections and turn restrictions. - Refer to Figures 6a and 6b.
SIDRA modelling	Impact on intersection operation - The operation of the street network under additional traffic loading was modelled using SIDRA Network modelling. Table 2 contains a summary of SIDRA modelling results. - The modelling results were compared to the results of the existing traffic model. The results indicated the following: - The Level of Service for the Ironbark Avenue / Tallowwood Avenue intersection remained the same, LoS A for both the morning and afternoon peak hours. - The Level of Service for the Tallowwood Avenue / Kurrajong Road Avenue intersection remained the same, LoS A for the morning peak hour and LoS B for the afternoon peak hour. - The Level of Service for the Kurrajong Road / Ingham Drive intersection remained the same, LoS A for both the morning and afternoon peak hours. - Modelling results indicate very minor increases in average delays and queue lengths. There will be no noticeable changes to the existing road network operation.
Conclusion	- Additional traffic generation is very minor and will have no noticeable impact on the existing road network. - The operation of the intersection will remain unchanged.

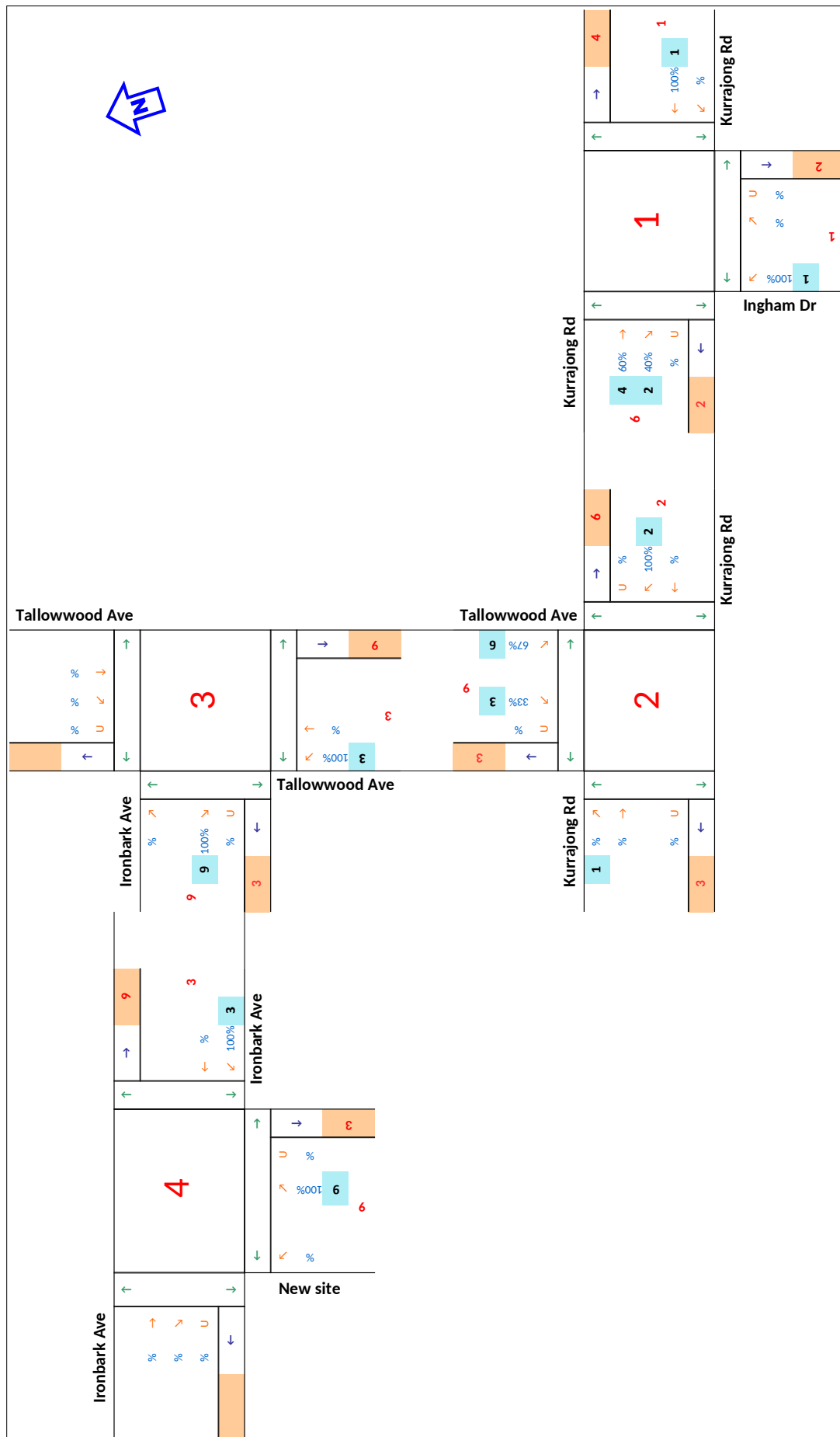


Figure 6a. Distribution of additional traffic volumes - morning peak

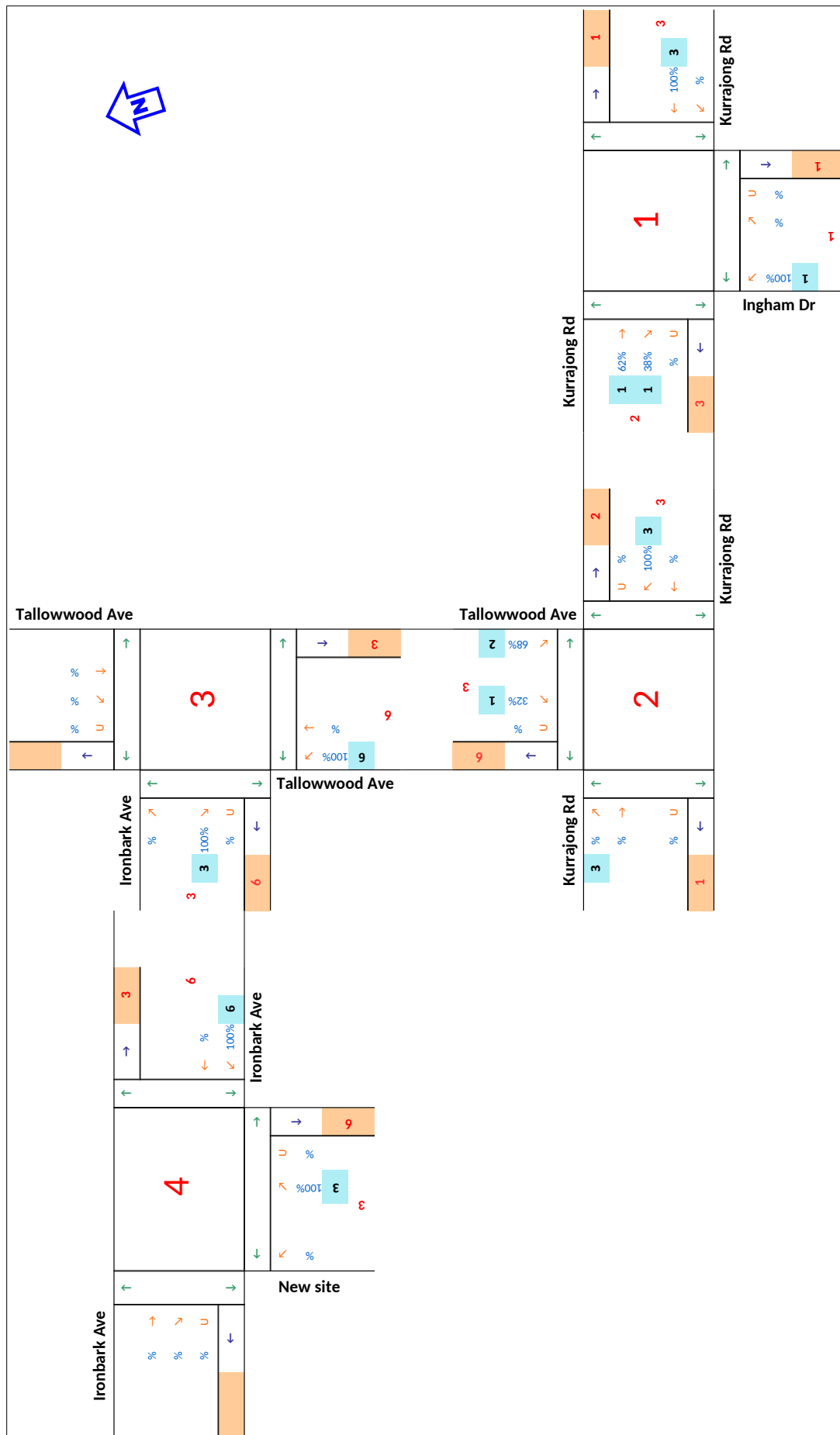


Figure 6b. Distribution of additional traffic volumes - afternoon peak

Table 2. Results of SIDRA analysis

№	Intersection	Sidra									
		AM					PM				
		AVD	LOS	DS	Queue, m	Movement	AVD	LOS	DS	Queue, m	Movement
1	Kurrajong Rd / Ingham Dr	13.3	A	0.669	53.3	KRd WB T	14.0	A	0.72	65.7	KRd EB T
2	Kurrajong Rd / Tallowwood Ave	13.0	A	0.311	3.0	KRd WB T	15.2	B	0.34	5.4	KRd WB T
3	Tallowwood Ave / Ironbark Ave	5.5	A	0.022	0.5	IAve EB R	5.7	A	0.03	0.6	IAve EB R

Future, Commuter Peak											
№	Intersection	Sidra									
		AM					PM				
		AVD	LOS	DS	Queue, m	Movement	AVD	LOS	DS	Queue, m	Movement
1	Kurrajong Rd / Ingham Dr	13.3	A	0.672	54.1	KRd WB T	14.1	A	0.73	66.3	KRd EB T
2	Kurrajong Rd / Tallowwood Ave	13.1	A	0.313	3.3	KRd WB T	15.2	B	0.34	5.9	KRd WB T
3	Tallowwood Ave / Ironbark Ave	5.5	A	0.03	0.7	IAve EB R	5.7	A	0.04	0.6	IAve EB R

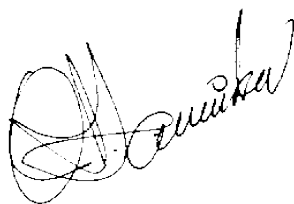
Legend:

KRd	Kurrajong Rd	EB	Eastbound
IDr	Ingham Dr	WB	Westbound
TAve	Tallowwood Ave	NB	Northbound
IAve	Ironbark Ave	SB	Southbound
		T	Through movement
		R	Right hand turn
		L	Left hand turn

Level of service criteria for intersections			
Level of Service	Average Delay per Vehicle (secs/veh)	Traffic Signals, Roundabout	Give Way & Stop Signs
A	< 14	Good operation	Good operation
B	15 to 28	Good with acceptable delays & spare capacity	Acceptable delays & spare capacity
C	29 to 42	Satisfactory	Satisfactory, but accident study required
D	43 to 56	Operating near capacity	Near capacity & accident study required
E	57 to 70	At capacity; at signals, incidents will cause excessive delays; Roundabouts require other control mode	At capacity, requires other control mode

Source: RTA (2002) Guide to Traffic Generating Developments

- | | |
|--------------------|--|
| Conclusions | <ul style="list-style-type: none"> • Proposed parking provision <ul style="list-style-type: none"> ◦ Complies with the requirements of State Environmental Planning Policy (Affordable Rental Housing) 2009 for car parking provision. ◦ Complies with Council's Development Control Plan requirements in terms of design. • Traffic impacts <ul style="list-style-type: none"> ◦ The additional traffic from the proposed development will be minimal and will have no negative impacts on street network operation • Design of access, car parking and servicing facilities <ul style="list-style-type: none"> ◦ Complies with the relevant Standards • The proposed development is supportable on traffic and parking grounds. |
|--------------------|--|



Oleg I. Sannikov

Director

MEngSc (Traffic Engineering)

MIEAust, PEng

FAITPM

References:

State Environmental Planning Policy (Affordable Rental Housing) 2009

Liverpool Development Control Plan 2008

Guide to Traffic Generating Developments RMS (2002)

AS/NZS 2890.1:2004: Parking Facilities – Off-street car parking

AS/NZS 2890.6:2009: Parking Facilities – Off-street parking for people with disabilities

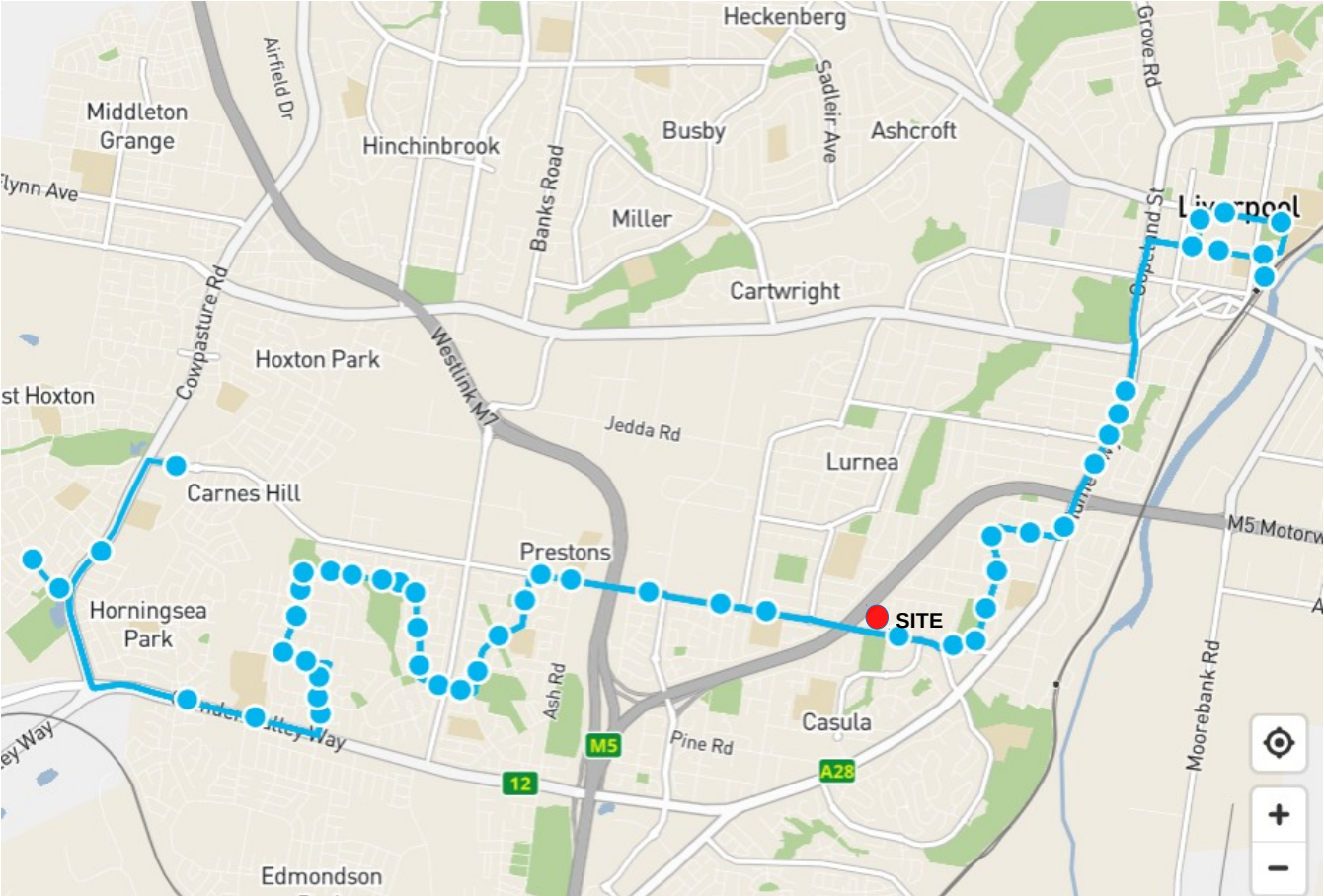
Appendix

Bus routes

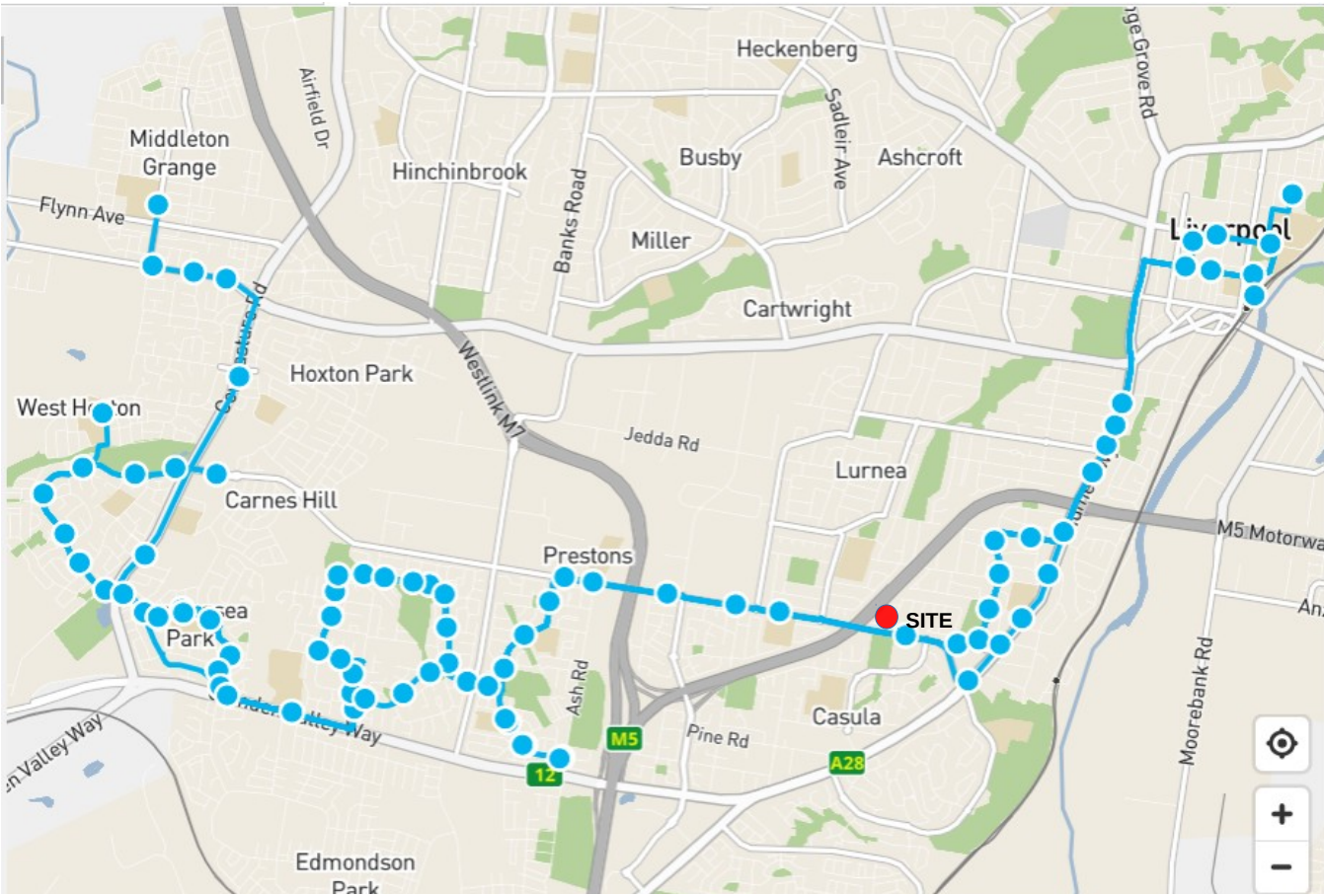
Results of SIDRA analysis

Car park design checks and vehicle turning diagrams

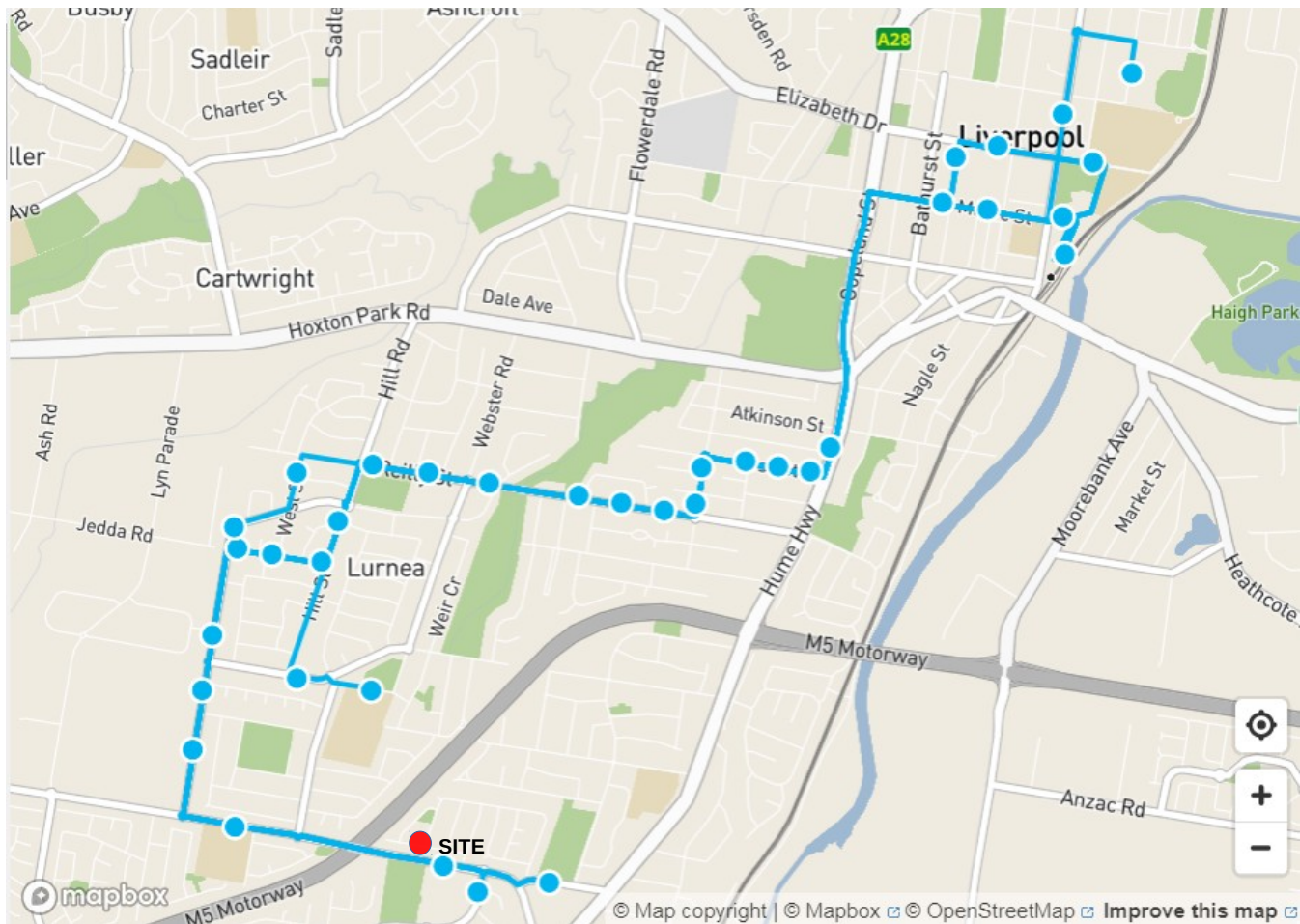
Bus Route 851



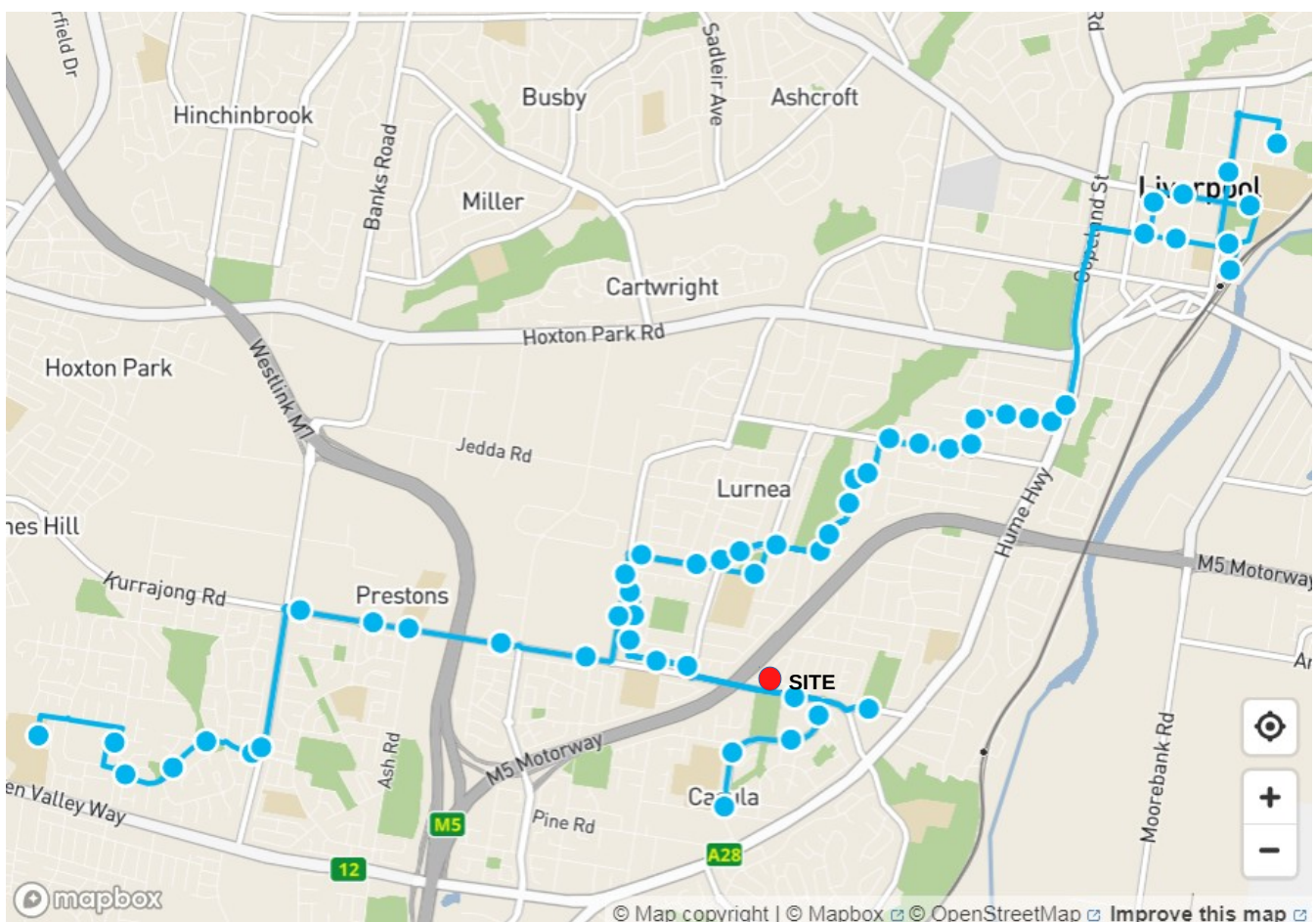
Bus Route 852



Bus Route 865



Bus Route 866



SITE LAYOUT

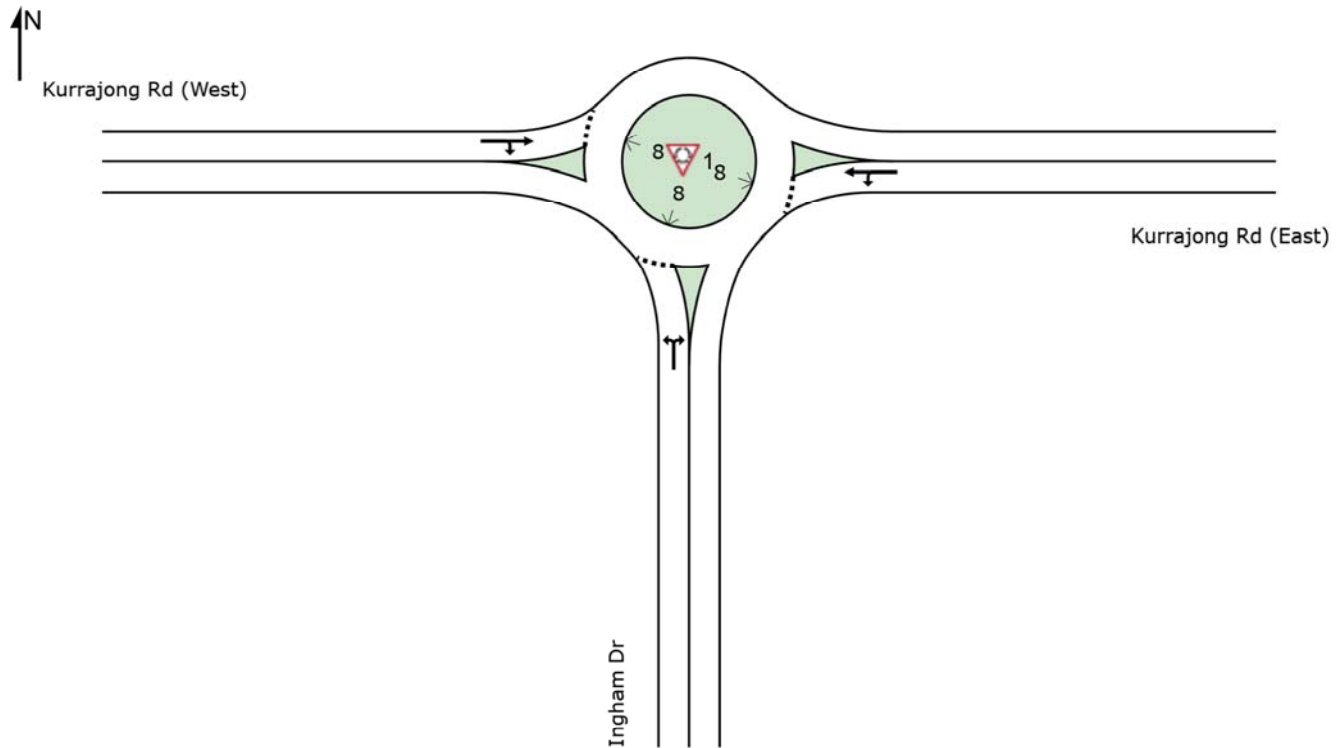
Site: 1 [Kurrajong Rd / Ingham Dr AM Ex]

18052

Kurrajong Rd / Ingham Dr AM Ex

Site Category: (None)

Roundabout



SIDRA INTERSECTION 8.0 | Copyright © 2000-2018 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: TEF Consulting | Created: Monday, 11 June 2018 22:28:08

Project: D:\Dropbox___DB current TEF projects_NR\18052 - 30-38 Ironbark Avenue Casula - SGCH\18052_modelling\18052 sidra\18052 - 30-38 Ironbark Avenue Casula.sip8

MOVEMENT SUMMARY



Site: 1 [Kurrajong Rd / Ingham Dr AM Ex]

18052

Kurrajong Rd / Ingham Dr AM Ex

Site Category: (None)

Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Ingham Dr												
1	L2	189	1.7	0.594	10.4	LOS A	5.7	40.2	0.84	0.91	0.98	41.5
3	R2	288	1.8	0.594	13.3	LOS A	5.7	40.2	0.84	0.91	0.98	44.4
Approach		478	1.8	0.594	12.2	LOS A	5.7	40.2	0.84	0.91	0.98	43.3
East: Kurrajong Rd (East)												
4	L2	262	2.0	0.669	8.0	LOS A	7.4	53.3	0.78	0.72	0.82	47.3
5	T1	429	4.9	0.669	8.0	LOS A	7.4	53.3	0.78	0.72	0.82	22.3
Approach		692	3.8	0.669	8.0	LOS A	7.4	53.3	0.78	0.72	0.82	33.6
West: Kurrajong Rd (West)												
11	T1	381	6.6	0.647	8.3	LOS A	6.9	50.0	0.81	0.80	0.89	33.8
12	R2	234	0.5	0.647	11.1	LOS A	6.9	50.0	0.81	0.80	0.89	46.0
Approach		615	4.3	0.647	9.4	LOS A	6.9	50.0	0.81	0.80	0.89	40.3
All Vehicles		1784	3.4	0.669	9.6	LOS A	7.4	53.3	0.80	0.80	0.89	38.7

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

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

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

Roundabout Capacity Model: SIDRA Standard.

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

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

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

SIDRA INTERSECTION 8.0 | Copyright © 2000-2018 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: TEF Consulting | Processed: Monday, 11 June 2018 22:26:55

Project: D:\Dropbox__DB current TEF projects_NR\18052 - 30-38 Ironbark Avenue Casula - SGCH\18052_modelling\18052 sidra\18052 - 30-38 Ironbark Avenue Casula.sip8

MOVEMENT SUMMARY



Site: 1 [Kurrajong Rd / Ingham Dr AM Fu]

18052

Kurrajong Rd / Ingham Dr AM Fu

Site Category: (None)

Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Ingham Dr												
1	L2	191	1.7	0.597	10.5	LOS A	5.7	40.6	0.85	0.91	0.98	41.4
3	R2	288	1.8	0.597	13.3	LOS A	5.7	40.6	0.85	0.91	0.98	44.4
Approach		479	1.8	0.597	12.2	LOS A	5.7	40.6	0.85	0.91	0.98	43.2
East: Kurrajong Rd (East)												
4	L2	262	2.0	0.672	8.1	LOS A	7.5	54.1	0.78	0.73	0.83	47.2
5	T1	431	4.9	0.672	8.1	LOS A	7.5	54.1	0.78	0.73	0.83	22.3
Approach		693	3.8	0.672	8.1	LOS A	7.5	54.1	0.78	0.73	0.83	33.5
West: Kurrajong Rd (West)												
11	T1	385	6.6	0.653	8.4	LOS A	7.1	51.2	0.81	0.80	0.90	33.7
12	R2	236	0.4	0.653	11.2	LOS A	7.1	51.2	0.81	0.80	0.90	45.9
Approach		621	4.2	0.653	9.4	LOS A	7.1	51.2	0.81	0.80	0.90	40.2
All Vehicles		1793	3.4	0.672	9.7	LOS A	7.5	54.1	0.81	0.80	0.90	38.6

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

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

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

Roundabout Capacity Model: SIDRA Standard.

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

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

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

SIDRA INTERSECTION 8.0 | Copyright © 2000-2018 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: TEF Consulting | Processed: Monday, 11 June 2018 22:26:57

Project: D:\Dropbox__DB current TEF projects_NR\18052 - 30-38 Ironbark Avenue Casula - SGCH\18052_modelling\18052 sidra\18052 - 30-38 Ironbark Avenue Casula.sip8

MOVEMENT SUMMARY

 **Site: 1 [Kurrajong Rd / Ingham Dr PM Ex]**

18052

Kurrajong Rd / Ingham Dr PM Ex

Site Category: (None)

Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Ingham Dr												
1	L2	122	1.7	0.616	10.9	LOS A	6.2	43.6	0.87	0.93	1.03	40.8
3	R2	368	1.1	0.616	13.7	LOS A	6.2	43.6	0.87	0.93	1.03	43.8
Approach		491	1.3	0.616	13.0	LOS A	6.2	43.6	0.87	0.93	1.03	43.1
East: Kurrajong Rd (East)												
4	L2	294	1.4	0.709	8.6	LOS A	8.8	63.2	0.83	0.75	0.91	46.9
5	T1	439	3.6	0.709	8.6	LOS A	8.8	63.2	0.83	0.75	0.91	22.1
Approach		733	2.7	0.709	8.6	LOS A	8.8	63.2	0.83	0.75	0.91	33.8
West: Kurrajong Rd (West)												
11	T1	396	3.5	0.724	11.1	LOS A	9.2	65.7	0.92	0.95	1.15	30.6
12	R2	237	0.0	0.724	14.0	LOS A	9.2	65.7	0.92	0.95	1.15	43.4
Approach		633	2.2	0.724	12.2	LOS A	9.2	65.7	0.92	0.95	1.15	37.2
All Vehicles		1856	2.2	0.724	11.0	LOS A	9.2	65.7	0.87	0.87	1.02	37.8

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

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

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

Roundabout Capacity Model: SIDRA Standard.

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

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

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

SIDRA INTERSECTION 8.0 | Copyright © 2000-2018 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: TEF Consulting | Processed: Monday, 11 June 2018 22:26:55

Project: D:\Dropbox__DB current TEF projects_NR\18052 - 30-38 Ironbark Avenue Casula - SGCH\18052_modelling\18052 sidra\18052 - 30-38 Ironbark Avenue Casula.sip8

MOVEMENT SUMMARY

 **Site: 1 [Kurrajong Rd / Ingham Dr PM Fu]**

18052
Kurrajong Rd / Ingham Dr PM Fu
Site Category: (None)
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Ingham Dr												
1	L2	123	1.7	0.620	11.0	LOS A	6.2	44.2	0.87	0.94	1.04	40.7
3	R2	368	1.1	0.620	13.8	LOS A	6.2	44.2	0.87	0.94	1.04	43.7
Approach		492	1.3	0.620	13.1	LOS A	6.2	44.2	0.87	0.94	1.04	43.0
East: Kurrajong Rd (East)												
4	L2	294	1.4	0.713	8.7	LOS A	9.0	64.3	0.84	0.75	0.92	46.9
5	T1	442	3.6	0.713	8.7	LOS A	9.0	64.3	0.84	0.75	0.92	22.0
Approach		736	2.7	0.713	8.7	LOS A	9.0	64.3	0.84	0.75	0.92	33.8
West: Kurrajong Rd (West)												
11	T1	397	3.4	0.726	11.2	LOS A	9.3	66.3	0.93	0.95	1.15	30.5
12	R2	238	0.0	0.726	14.1	LOS A	9.3	66.3	0.93	0.95	1.15	43.3
Approach		635	2.2	0.726	12.3	LOS A	9.3	66.3	0.93	0.95	1.15	37.2
All Vehicles		1862	2.1	0.726	11.1	LOS A	9.3	66.3	0.88	0.87	1.03	37.8

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

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

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

Roundabout Capacity Model: SIDRA Standard.

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

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

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

SIDRA INTERSECTION 8.0 | Copyright © 2000-2018 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: TEF Consulting | Processed: Monday, 11 June 2018 22:26:57

Project: D:\Dropbox__DB current TEF projects_NR\18052 - 30-38 Ironbark Avenue Casula - SGCH\18052_modelling\18052 sidra\18052 - 30-38 Ironbark Avenue Casula.sip8

SITE LAYOUT

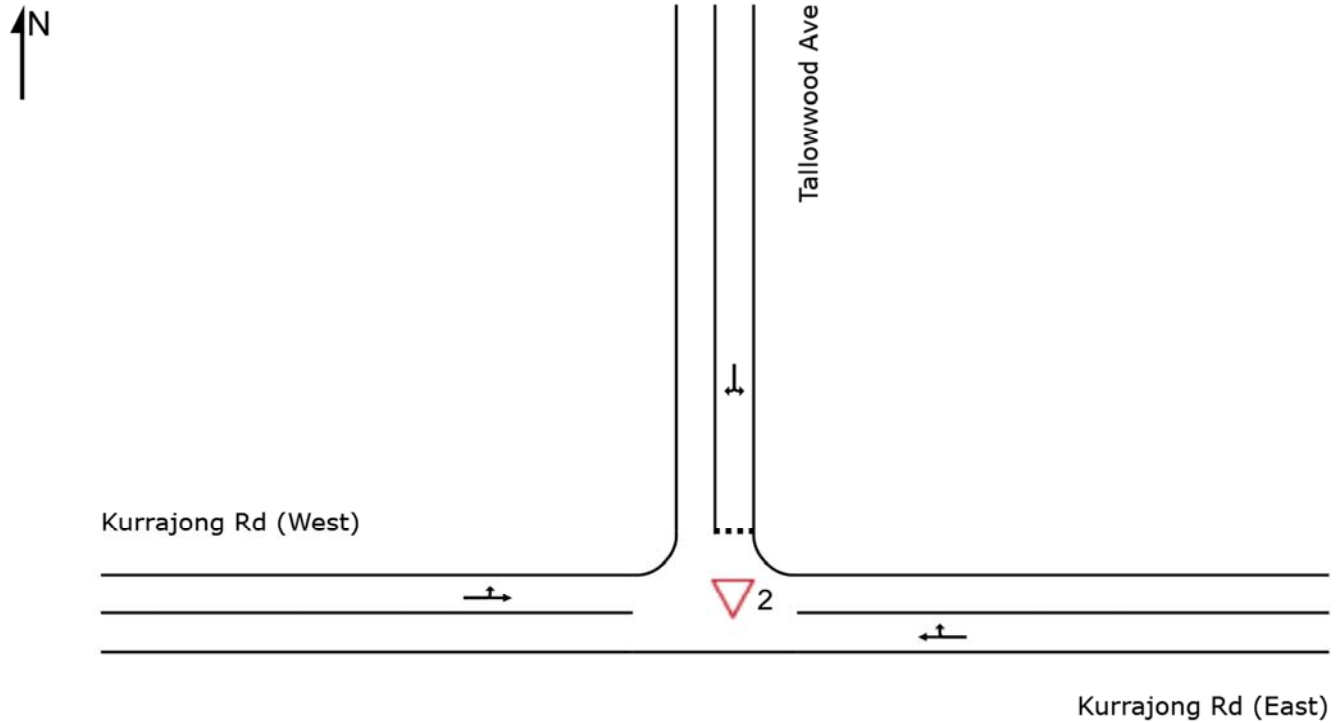
Site: 2 [Kurrajong Rd / Tallowwood Ave AM Ex]

18052

Kurrajong Rd / Tallowwood Ave AM Ex

Site Category: (None)

Giveaway / Yield (Two-Way)



SIDRA INTERSECTION 8.0 | Copyright © 2000-2018 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: TEF Consulting | Created: Monday, 11 June 2018 22:28:27

Project: D:\Dropbox___DB current TEF projects_NR\18052 - 30-38 Ironbark Avenue Casula - SGCH\18052_modelling\18052 sidra\18052 - 30-38 Ironbark Avenue Casula.sip8

MOVEMENT SUMMARY

▽ Site: 2 [Kurrajong Rd / Tallowwood Ave AM Ex]

18052

Kurrajong Rd / Tallowwood Ave AM Ex

Site Category: (None)

Giveway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Kurrajong Rd (East)												
5	T1	561	4.5	0.311	0.3	LOS A	0.4	3.0	0.08	0.03	0.09	58.9
6	R2	23	0.0	0.311	8.9	LOS A	0.4	3.0	0.08	0.03	0.09	43.2
Approach		584	4.3	0.311	0.7	NA	0.4	3.0	0.08	0.03	0.09	58.7
North: Tallowwood Ave												
7	L2	38	0.0	0.097	6.1	LOS A	0.3	2.3	0.58	0.76	0.58	25.8
9	R2	19	0.0	0.097	13.0	LOS A	0.3	2.3	0.58	0.76	0.58	45.8
Approach		57	0.0	0.097	8.4	LOS A	0.3	2.3	0.58	0.76	0.58	36.5
West: Kurrajong Rd (West)												
10	L2	38	72.2	0.306	6.4	LOS A	0.0	0.0	0.00	0.04	0.00	48.2
11	T1	559	0.0	0.306	0.0	LOS A	0.0	0.0	0.00	0.04	0.00	59.8
Approach		597	4.6	0.306	0.4	NA	0.0	0.0	0.00	0.04	0.00	58.9
All Vehicles		1238	4.3	0.311	0.9	NA	0.4	3.0	0.06	0.06	0.07	58.0

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

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

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

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

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

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

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

SIDRA INTERSECTION 8.0 | Copyright © 2000-2018 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: TEF Consulting | Processed: Monday, 11 June 2018 22:26:56

Project: D:\Dropbox__DB current TEF projects_NR\18052 - 30-38 Ironbark Avenue Casula - SGCH\18052_modelling\18052 sidra\18052 - 30-38 Ironbark Avenue Casula.sip8

MOVEMENT SUMMARY

▽ Site: 2 [Kurrajong Rd / Tallowwood Ave AM Fu]

18052

Kurrajong Rd / Tallowwood Ave AM Fu

Site Category: (None)

Giveway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Kurrajong Rd (East)												
5	T1	561	4.5	0.313	0.3	LOS A	0.4	3.3	0.09	0.03	0.10	58.8
6	R2	25	0.0	0.313	9.0	LOS A	0.4	3.3	0.09	0.03	0.10	43.0
Approach		586	4.3	0.313	0.7	NA	0.4	3.3	0.09	0.03	0.10	58.6
North: Tallowwood Ave												
7	L2	44	0.0	0.114	6.1	LOS A	0.4	2.7	0.58	0.77	0.58	25.7
9	R2	22	0.0	0.114	13.1	LOS A	0.4	2.7	0.58	0.77	0.58	45.7
Approach		66	0.0	0.114	8.5	LOS A	0.4	2.7	0.58	0.77	0.58	36.4
West: Kurrajong Rd (West)												
10	L2	39	70.3	0.307	6.4	LOS A	0.0	0.0	0.00	0.04	0.00	48.3
11	T1	559	0.0	0.307	0.0	LOS A	0.0	0.0	0.00	0.04	0.00	59.7
Approach		598	4.6	0.307	0.4	NA	0.0	0.0	0.00	0.04	0.00	58.9
All Vehicles		1251	4.2	0.313	1.0	NA	0.4	3.3	0.07	0.07	0.08	57.8

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

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

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

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

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

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

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

SIDRA INTERSECTION 8.0 | Copyright © 2000-2018 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: TEF Consulting | Processed: Monday, 11 June 2018 22:26:58

Project: D:\Dropbox__DB current TEF projects_NR\18052 - 30-38 Ironbark Avenue Casula - SGCH\18052_modelling\18052 sidra\18052 - 30-38 Ironbark Avenue Casula.sip8

MOVEMENT SUMMARY

▽ Site: 3 [Kurrajong Rd / Tallowwood Ave PM Ex]

18052

Tallowwood / Ironbark Ave Ave AM Ex

Site Category: (None)

Giveway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Kurrajong Rd (East)												
5	T1	580	3.1	0.337	0.6	LOS A	0.8	5.4	0.13	0.04	0.16	58.1
6	R2	38	2.8	0.337	9.5	LOS A	0.8	5.4	0.13	0.04	0.16	41.3
Approach		618	3.1	0.337	1.1	NA	0.8	5.4	0.13	0.04	0.16	57.8
North: Tallowwood Ave												
7	L2	26	8.0	0.077	6.5	LOS A	0.3	1.9	0.61	0.77	0.61	24.4
9	R2	13	8.3	0.077	15.2	LOS B	0.3	1.9	0.61	0.77	0.61	44.4
Approach		39	8.1	0.077	9.3	LOS A	0.3	1.9	0.61	0.77	0.61	34.7
West: Kurrajong Rd (West)												
10	L2	45	30.2	0.318	5.9	LOS A	0.0	0.0	0.00	0.04	0.00	48.8
11	T1	584	0.0	0.318	0.0	LOS A	0.0	0.0	0.00	0.04	0.00	59.4
Approach		629	2.2	0.318	0.5	NA	0.0	0.0	0.00	0.04	0.00	58.6
All Vehicles		1286	2.8	0.337	1.1	NA	0.8	5.4	0.08	0.06	0.10	57.6

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

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

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

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

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

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

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

SIDRA INTERSECTION 8.0 | Copyright © 2000-2018 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: TEF Consulting | Processed: Monday, 11 June 2018 22:26:56

Project: D:\Dropbox__DB current TEF projects_NR\18052 - 30-38 Ironbark Avenue Casula - SGCH\18052_modelling\18052 sidra\18052 - 30-38 Ironbark Avenue Casula.sip8

MOVEMENT SUMMARY

▽ Site: 3 [Kurrajong Rd / Tallowwood Ave PM Fu]

18052

Tallowwood / Ironbark Ave Ave AM Fu

Site Category: (None)

Giveway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Kurrajong Rd (East)												
5	T1	580	3.1	0.340	0.7	LOS A	0.8	5.9	0.14	0.04	0.17	58.0
6	R2	41	2.6	0.340	9.5	LOS A	0.8	5.9	0.14	0.04	0.17	41.0
Approach		621	3.1	0.340	1.2	NA	0.8	5.9	0.14	0.04	0.17	57.6
North: Tallowwood Ave												
7	L2	28	7.4	0.083	6.5	LOS A	0.3	2.0	0.61	0.78	0.61	24.4
9	R2	14	7.7	0.083	15.2	LOS B	0.3	2.0	0.61	0.78	0.61	44.4
Approach		42	7.5	0.083	9.3	LOS A	0.3	2.0	0.61	0.78	0.61	34.8
West: Kurrajong Rd (West)												
10	L2	48	28.3	0.319	5.9	LOS A	0.0	0.0	0.00	0.04	0.00	48.8
11	T1	584	0.0	0.319	0.0	LOS A	0.0	0.0	0.00	0.04	0.00	59.4
Approach		633	2.2	0.319	0.5	NA	0.0	0.0	0.00	0.04	0.00	58.5
All Vehicles		1296	2.8	0.340	1.1	NA	0.8	5.9	0.09	0.07	0.10	57.4

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

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

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

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

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

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

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

SIDRA INTERSECTION 8.0 | Copyright © 2000-2018 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: TEF Consulting | Processed: Monday, 11 June 2018 22:26:58

Project: D:\Dropbox__DB current TEF projects_NR\18052 - 30-38 Ironbark Avenue Casula - SGCH\18052_modelling\18052 sidra\18052 - 30-38 Ironbark Avenue Casula.sip8

SITE LAYOUT

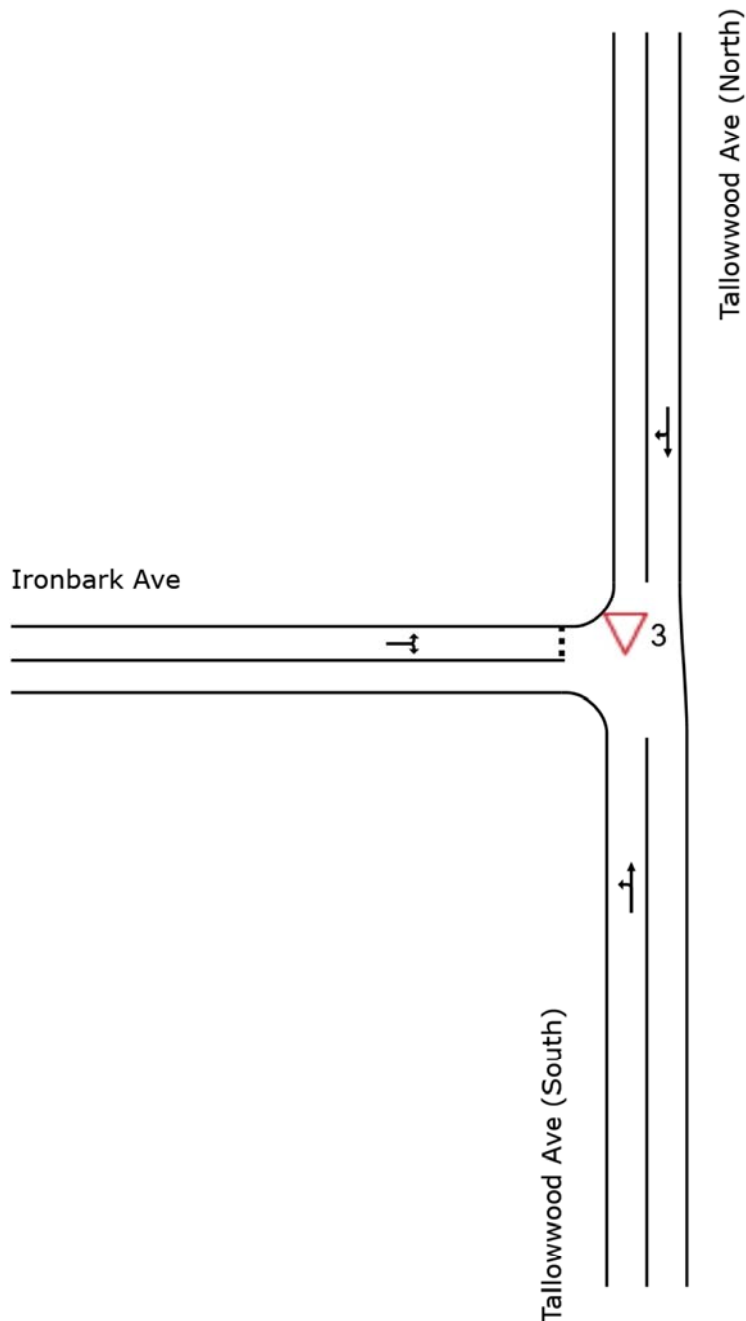
▽ Site: 3 [Tallowwood Ave / Ironbark Ave AM Ex]

18052

Tallowwood Ave / Ironbark Ave AM Ex

Site Category: (None)

Giveaway / Yield (Two-Way)



MOVEMENT SUMMARY

▽ Site: 3 [Tallowwood Ave / Ironbark Ave AM Ex]

18052

Tallowwood Ave / Ironbark Ave AM Ex

Site Category: (None)

Giveway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Tallowwood Ave (South)												
10	L2	14	0.0	0.014	3.8	LOS A	0.0	0.0	0.00	0.27	0.00	48.9
11	T1	15	0.0	0.014	0.0	LOS A	0.0	0.0	0.00	0.27	0.00	53.9
Approach		28	0.0	0.014	1.8	NA	0.0	0.0	0.00	0.27	0.00	51.4
North: Tallowwood Ave (North)												
5	T1	24	0.0	0.013	0.0	LOS A	0.0	0.0	0.01	0.03	0.01	59.0
6	R2	1	0.0	0.013	5.5	LOS A	0.0	0.0	0.01	0.03	0.01	54.3
Approach		25	0.0	0.013	0.2	NA	0.0	0.0	0.01	0.03	0.01	58.7
West: Ironbark Ave												
7	L2	1	0.0	0.022	5.6	LOS A	0.1	0.5	0.10	0.56	0.10	46.2
9	R2	26	0.0	0.022	5.6	LOS A	0.1	0.5	0.10	0.56	0.10	38.9
Approach		27	0.0	0.022	5.6	LOS A	0.1	0.5	0.10	0.56	0.10	39.3
All Vehicles		81	0.0	0.022	2.6	NA	0.1	0.5	0.04	0.29	0.04	48.4

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

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

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

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

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

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

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

SIDRA INTERSECTION 8.0 | Copyright © 2000-2018 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: TEF Consulting | Processed: Monday, 11 June 2018 22:26:56

Project: D:\Dropbox__DB current TEF projects_NR\18052 - 30-38 Ironbark Avenue Casula - SGCH\18052_modelling\18052 sidra\18052 - 30-38 Ironbark Avenue Casula.sip8

MOVEMENT SUMMARY

▽ Site: 3 [Tallowwood Ave / Ironbark Ave AM Fu]

18052

Tallowwood Ave / Ironbark Ave AM Fu

Site Category: (None)

Giveway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Tallowwood Ave (South)												
10	L2	17	0.0	0.016	3.8	LOS A	0.0	0.0	0.00	0.30	0.00	48.4
11	T1	15	0.0	0.016	0.0	LOS A	0.0	0.0	0.00	0.30	0.00	53.3
Approach		32	0.0	0.016	2.0	NA	0.0	0.0	0.00	0.30	0.00	50.7
North: Tallowwood Ave (North)												
5	T1	24	0.0	0.013	0.0	LOS A	0.0	0.0	0.01	0.03	0.01	59.0
6	R2	1	0.0	0.013	5.5	LOS A	0.0	0.0	0.01	0.03	0.01	54.3
Approach		25	0.0	0.013	0.2	NA	0.0	0.0	0.01	0.03	0.01	58.7
West: Ironbark Ave												
7	L2	1	0.0	0.030	5.6	LOS A	0.1	0.7	0.11	0.56	0.11	46.2
9	R2	36	0.0	0.030	5.6	LOS A	0.1	0.7	0.11	0.56	0.11	38.9
Approach		37	0.0	0.030	5.6	LOS A	0.1	0.7	0.11	0.56	0.11	39.2
All Vehicles		94	0.0	0.030	3.0	NA	0.1	0.7	0.04	0.33	0.04	47.1

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

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

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

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

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

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

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

SIDRA INTERSECTION 8.0 | Copyright © 2000-2018 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: TEF Consulting | Processed: Monday, 11 June 2018 22:26:59

Project: D:\Dropbox__DB current TEF projects_NR\18052 - 30-38 Ironbark Avenue Casula - SGCH\18052_modelling\18052 sidra\18052 - 30-38 Ironbark Avenue Casula.sip8

MOVEMENT SUMMARY

▽ Site: 3 [Tallowwood Ave / Ironbark Ave PM Ex]

18052

Tallowwood Ave / Ironbark Ave PM Ex

Site Category: (None)

Giveway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Tallowwood Ave (South)												
10	L2	38	2.8	0.032	3.8	LOS A	0.0	0.0	0.00	0.34	0.00	47.0
11	T1	24	0.0	0.032	0.0	LOS A	0.0	0.0	0.00	0.34	0.00	52.6
Approach		62	1.7	0.032	2.3	NA	0.0	0.0	0.00	0.34	0.00	49.1
North: Tallowwood Ave (North)												
5	T1	11	10.0	0.006	0.0	LOS A	0.0	0.0	0.03	0.06	0.03	57.6
6	R2	1	0.0	0.006	5.6	LOS A	0.0	0.0	0.03	0.06	0.03	53.5
Approach		12	9.1	0.006	0.5	NA	0.0	0.0	0.03	0.06	0.03	57.0
West: Ironbark Ave												
7	L2	1	0.0	0.024	5.6	LOS A	0.1	0.6	0.12	0.56	0.12	46.1
9	R2	27	7.7	0.024	5.7	LOS A	0.1	0.6	0.12	0.56	0.12	38.6
Approach		28	7.4	0.024	5.7	LOS A	0.1	0.6	0.12	0.56	0.12	39.0
All Vehicles		102	4.1	0.032	3.1	NA	0.1	0.6	0.04	0.37	0.04	46.5

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

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

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

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

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

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

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

SIDRA INTERSECTION 8.0 | Copyright © 2000-2018 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: TEF Consulting | Processed: Monday, 11 June 2018 22:26:57

Project: D:\Dropbox__DB current TEF projects_NR\18052 - 30-38 Ironbark Avenue Casula - SGCH\18052_modelling\18052 sidra\18052 - 30-38 Ironbark Avenue Casula.sip8

MOVEMENT SUMMARY

▽ Site: 3 [Tallowwood Ave / Ironbark Ave PM Fu]

18052

Tallowwood Ave / Ironbark Ave PM Fu

Site Category: (None)

Giveway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Tallowwood Ave (South)												
10	L2	44	2.4	0.035	3.8	LOS A	0.0	0.0	0.00	0.36	0.00	46.8
11	T1	24	0.0	0.035	0.0	LOS A	0.0	0.0	0.00	0.36	0.00	52.2
Approach		68	1.5	0.035	2.5	NA	0.0	0.0	0.00	0.36	0.00	48.6
North: Tallowwood Ave (North)												
5	T1	11	10.0	0.006	0.0	LOS A	0.0	0.0	0.03	0.06	0.03	57.5
6	R2	1	0.0	0.006	5.6	LOS A	0.0	0.0	0.03	0.06	0.03	53.5
Approach		12	9.1	0.006	0.5	NA	0.0	0.0	0.03	0.06	0.03	57.0
West: Ironbark Ave												
7	L2	1	0.0	0.026	5.6	LOS A	0.1	0.6	0.12	0.56	0.12	46.1
9	R2	31	6.9	0.026	5.8	LOS A	0.1	0.6	0.12	0.56	0.12	38.6
Approach		32	6.7	0.026	5.7	LOS A	0.1	0.6	0.12	0.56	0.12	38.9
All Vehicles		112	3.8	0.035	3.2	NA	0.1	0.6	0.04	0.39	0.04	46.1

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

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

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

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

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

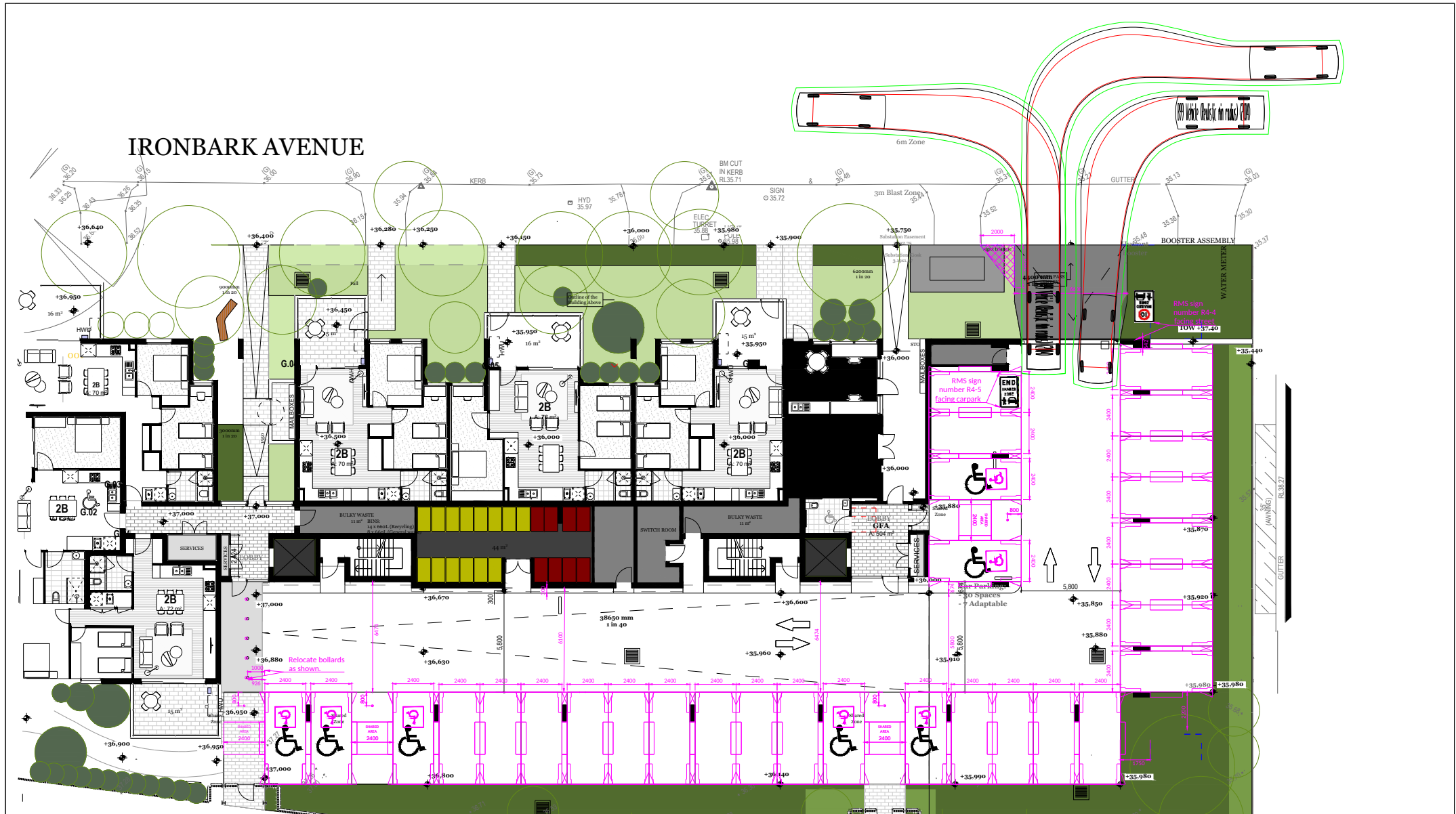
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

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

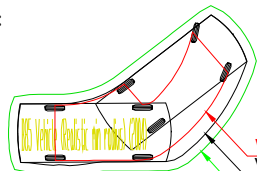
SIDRA INTERSECTION 8.0 | Copyright © 2000-2018 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: TEF Consulting | Processed: Monday, 11 June 2018 22:26:59

Project: D:\Dropbox__DB current TEF projects_NR\18052 - 30-38 Ironbark Avenue Casula - SGCH\18052_modelling\18052 sidra\18052 - 30-38 Ironbark Avenue Casula.sip8



LEGEND:



WHEEL TRACK
VEHICLE BODY
300 MM CLEARANCE



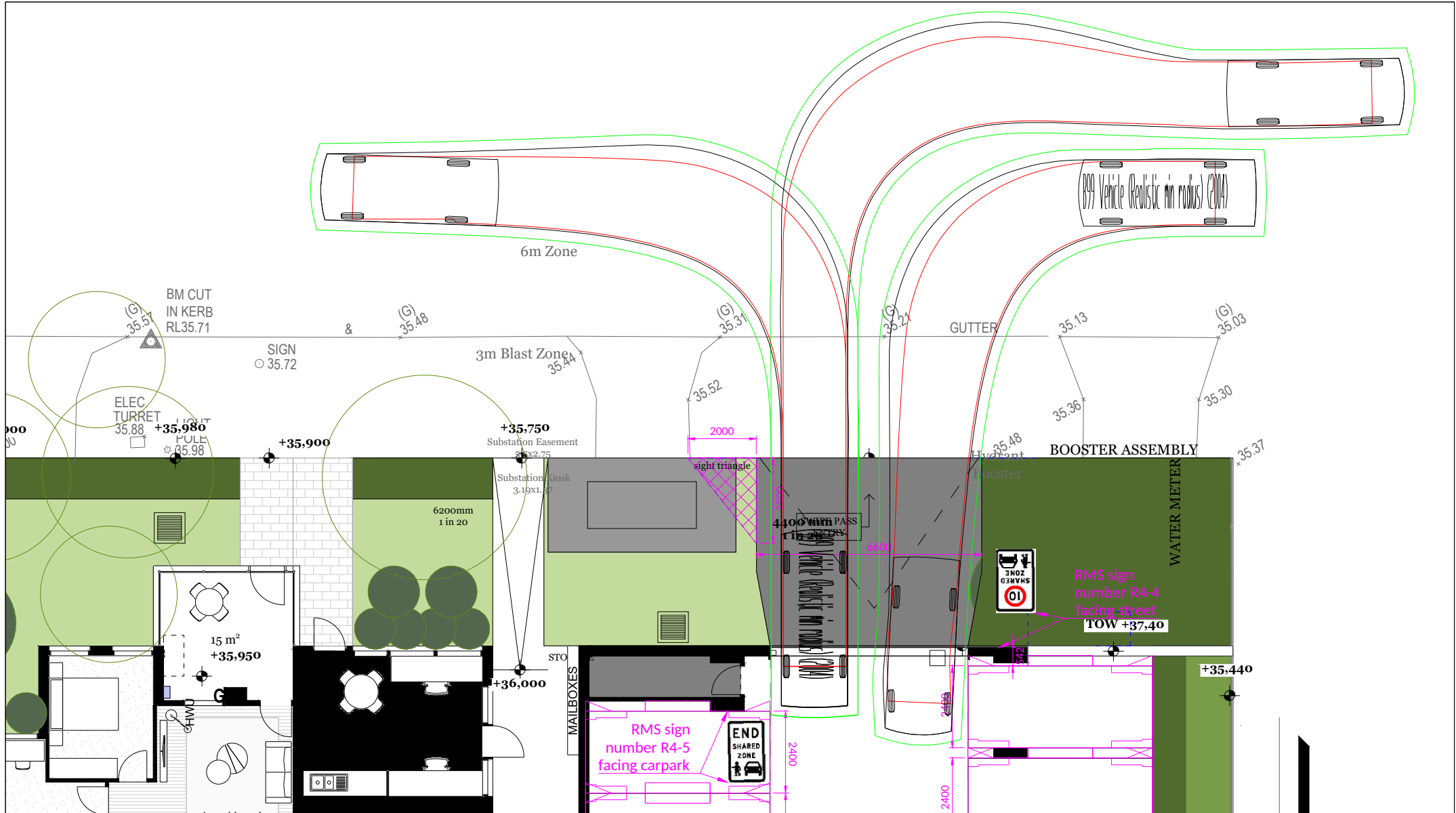
Dwg No 18152/01 Rev. B 20/02/2019

Client:
SGCH

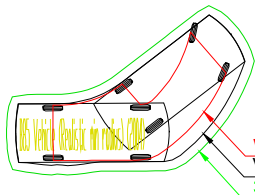
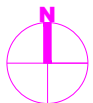
30-38 Ironbark Avenue, Casula, NSW 2170

Proposed car park layout
Design checks as per AS/NZS 2890 series

SCALE 1:300@A4



LEGEND:



Dwg No 18152/02 | Rev. A | 20/02/2019

Client:
SGCH

30-38 Ironbark Avenue, Casula, NSW 2170

SCALE 1:150@A4

Proposed car park layout
Design checks as per AS/NZS 2890 series