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TRAFFIC AND PARKING IMPACTS REPORT
FOR A DEVELOPMENT APPLICATION
FOR A PROPOSED AFFORDABLE HOUSING DEVELOPMENT
AT NO. 127–129 FLOWERDALE ROAD, LIVERPOOL, NSW 2170

Property address	127–129 Flowerdale Road, Liverpool, NSW 2170
Client	SGCH
Prepared by	O. Sannikov, MEngSc (Traffic Engineering), MIEAust, PEng, FAITPM
Date	21/02/2019
Job No.	18116
Report No.	18116 Rep 01

Item	Report
Site location	• Refer to **Figure 1.**
Existing land use	• One (1) single storey and one (1) double storey residential buildings
Proposed development	• Affordable housing development comprising ◦ A total of 39 units including ▪ 11 one bedroom units ▪ 28 two bedroom units ◦ Ground level car park ▪ 19 car parking spaces • Includes 4 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. ◦ Mainsbridge Avenue ▪ Local road ▪ 2 travel lanes and 2 parking lanes ◦ Flowerdale Road ▪ Regional road (MR 7266) ▪ 2 travel lanes and 2 parking lanes ◦ Hoxton Park Road ▪ State road (MR 681) ▪ 6 travel lanes and no parking lanes ◦ Frangipane Avenue ▪ Local road ▪ 2 travel lanes and 2 parking lanes ◦ Murphy Avenue ▪ Local road ▪ 2 travel lanes and 2 parking lanes ◦ Smith Crescent ▪ Local road ▪ 2 travel lanes and 2 parking lanes ◦ 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 Mainsbridge Avenue and on nearby streets such as Flowerdale Road, Smith Crescent, Frangipane Avenue and Murphy Avenue. ◦ There are unrestricted car parking opportunities across all streets.
	Public Transport
Bus	• The site is located 35 metres from a bus stop along Flowerdale Road. • Refer to **Figure 3.** ◦ Bus Route 853 ▪ Liverpool to Carnes Hill via Hoxton Park Road • 5 services operate approximately every 30 - 60 minutes during the morning peak. • 8 services operate approximately every 10 - 20 minutes during the afternoon peak. ▪ Carnes Hill to Liverpool via Hoxton Park Road • Only 2 services operate during the morning peak. • 4 services operate approximately every 30 - 60 minutes during the afternoon peak. ◦ Bus Route 854 ▪ Liverpool to Carnes Hill via Greenway Dr & Hoxton Park Road • 5 services operate approximately every 10 - 60 minutes during the morning peak. • 4 services operate approximately every 10 - 20 minutes during the afternoon peak. ◦ Carnes Hill to Liverpool via Greenway Dr and Hoxton Park Road

Item	Report
	• 3 services operate during the morning peak. • 6 services operate approximately every 10 - 50 minutes during the afternoon peak. • The morning peak was considered to be between 6:30 a.m. and 9:30 a.m. and the afternoon peak was considered to be between 3:30 p.m. and 6:30 p.m.

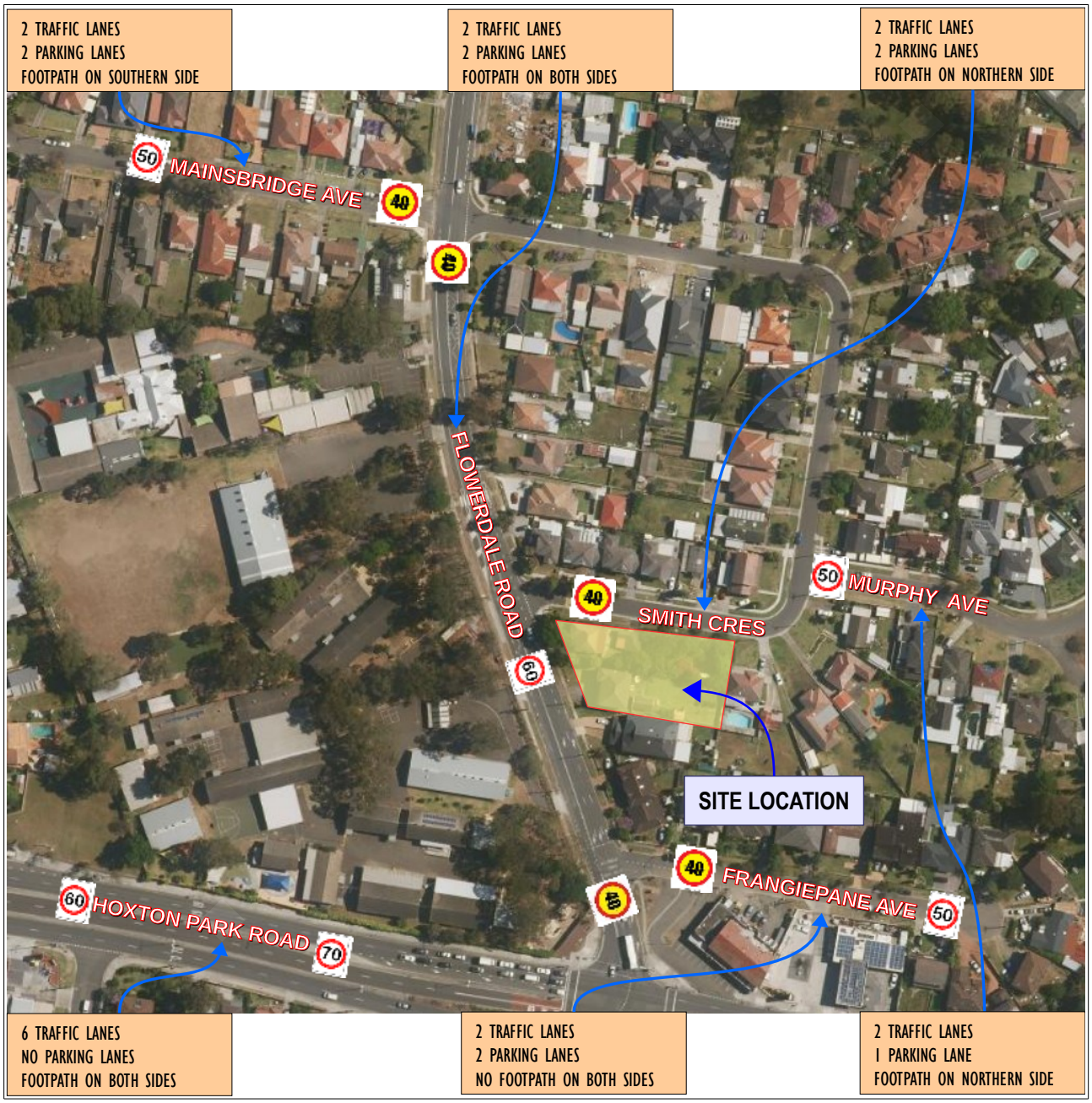


Figure 2. Street characteristics.

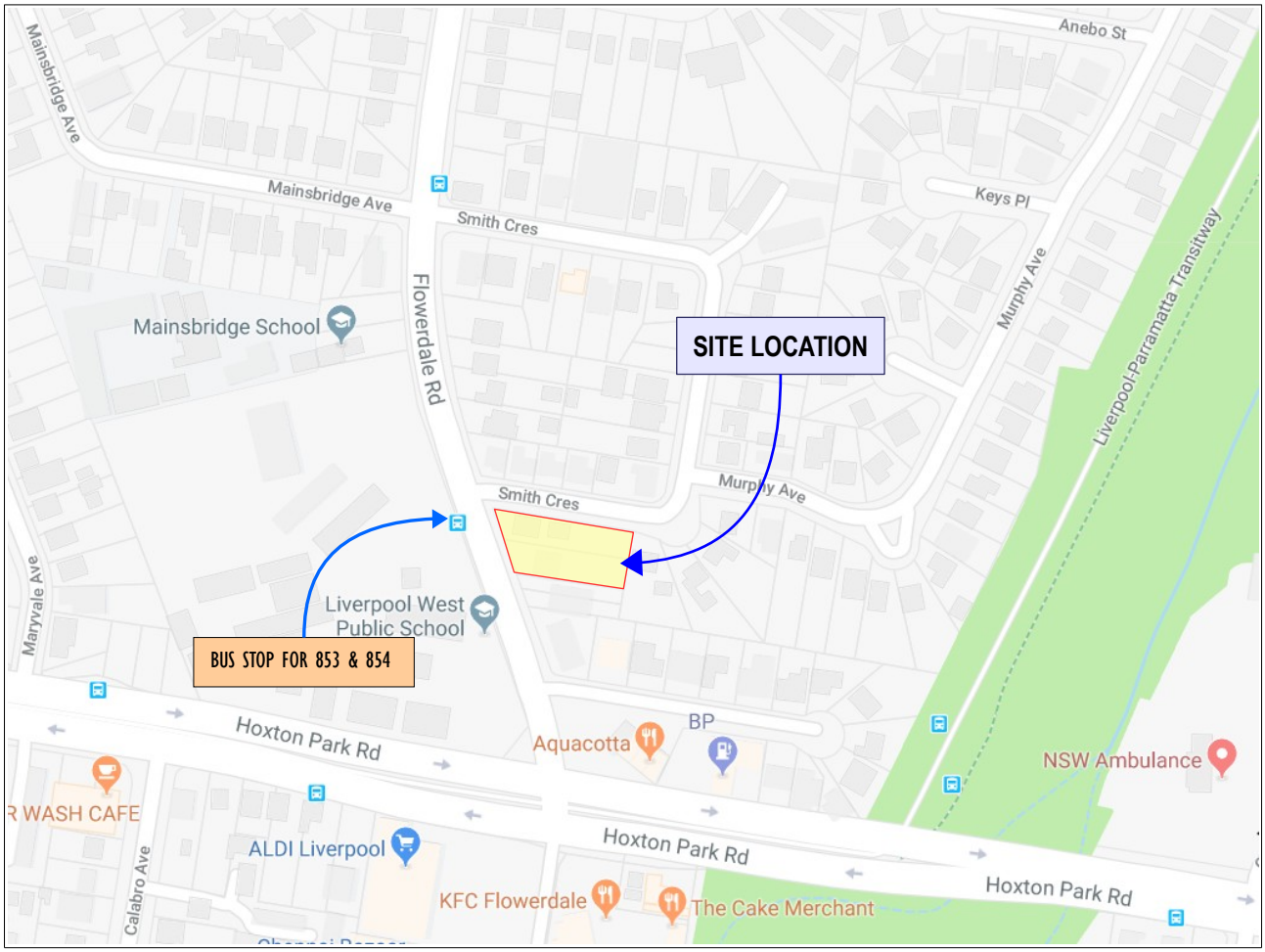


Figure 3. Public transport.

Item	Report
	Surveys and survey results
Parking survey	• A parking demand survey was conducted on Wednesday 19th of September 2018 ◦ AM survey was between 6:30 AM and 9:30 AM. ◦ PM survey was between 3:30 PM and 6:30 PM. • 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.
Survey results	• Refer to **Table 1** for survey results • Area 1a-5b (within 150 metres walking distance) ◦ No parking spaces were vacant from 1a – 2b & 3b due to the parking being available only for 2 hours: 8 -9 AM & 2:30 – 3:30 PM ◦ AM peak occurred at 9:00 AM. ◦ PM peak occurred at 5:00 PM. ◦ The survey results indicated that there were at least 26 spaces vacant throughout the day (to a maximum of 44) in the survey area. • Area 6-10 (between 150 to 250 metres walking distance) ◦ AM peak occurred at 9:00 AM. ◦ PM peak occurred at 6:00 PM. ◦ The survey results indicated that there were at least 46 spaces vacant throughout the day (to a maximum of 86) in the survey area. • Area 1a-10 (all areas within walking distance) ◦ AM peak occurred at 9:00 AM. ◦ PM peak occurred at 6:00 PM. ◦ The survey results indicated that there were at least 72 spaces vacant throughout the day (to a maximum of 128) in the survey area.

Figure 4. Parking survey locations.

Table 1. Parking survey results.

	Number of parked cars																	
	Parking Location															Total		
Time	1a	1b	2a	2b	3a	3b	4a	4b	5a	5b	6	7	8	9	10	1a-5b	6-10	All
6:30	NO PARKING	NO PARKING	NO PARKING	NO PARKING	0	NO PARKING	0	1	2	1	6	0	NO PARKING	9	2	4	17	21
7:00					0		0	1	3	0	0	4		0	0	4	4	8
7:30					2		0	1	0	0	5	0		0	0	3	5	8
8:00					4		0	0	2	2	5	3		8	2	8	18	26
8:30					3		1	0	2	1	0	3		11	9	7	23	30
9:00					4		4	7	3	2	8	3		16	17	20	44	64
9:30					0		2	3	2	1	8	3		15	0	8	26	34
15:30					0		0	2	0	0	7	0		0	0	2	7	9
16:00					0		0	0	1	3	0	3		6	6	4	15	19
16:30					0		0	1	1	3	6	0		0	0	5	6	11
17:00					0		1	2	2	3	0	1		7	4	8	12	20
17:30					0		0	2	2	3	6	0		6	3	7	15	22
18:00					0		0	2	2	3	5	4		5	3	7	17	24
18:30					0		0	1	2	2	6	4		5	3	5	18	23
No of spaces	NP	NP	NP	NP	4	NP	7	11	11	13	10	33	NP	29	18	46	90	136

	Number of vacant parking spaces																	
	Parking Location															Total		
Time	1a	1b	2a	2b	3a	3b	4a	4b	5a	5b	6	7	8	9	10	1a-5b	6-10	All
6:30	NO PARKING	NO PARKING	NO PARKING	NO PARKING	4	NO PARKING	7	10	9	12	4	33	NO PARKING	20	16	42	73	115
7:00					4		7	10	8	13	10	29		29	18	42	86	128
7:30					2		7	10	11	13	5	33		29	18	43	85	128
8:00					0		7	11	9	11	5	30		21	16	38	72	110
8:30					1		6	11	9	12	10	30		18	9	39	67	106
9:00					0		3	4	8	11	2	30		13	1	26	46	72
9:30					4		5	8	9	12	2	30		14	18	38	64	102
15:30					4		7	9	11	13	3	33		29	18	44	83	127
16:00					4		7	11	10	10	10	30		23	12	42	75	117
16:30					4		7	10	10	10	4	33		29	18	41	84	125
17:00					4		6	9	9	10	10	32		22	14	38	78	116
17:30					4		7	9	9	10	4	33		23	15	39	75	114
18:00					4		7	9	9	10	5	29		24	15	39	73	112
18:30					4		7	10	9	11	4	29		24	15	41	72	113

Item	Report	
	Traffic counts	
Intersection traffic volume counts	Location / type of control	Mainsbridge Avenue / Smith Crescent / Flowerdale Road (Four way intersection)
		Smith Crescent / Flowerdale Road (T-intersection)
		Hoxton Park Road / Flowerdale Road (Four way intersection)
	Date / Day of the week	Wednesday 19th September 2018 (AM to PM)
	Time period (AM)	06:00 to 10:15; peak hour occurred at 07:30–08:30
	Time period (PM)	15:30 to 19:15; peak hour occurred at 17:00-18:00
	• Refer to **Figure 5.**	
Intersection operation	• All intersections operated smoothly in both peak commuter periods, with spare capacity. ◦ Flowerdale Road / Hoxton Park Road intersection was the busiest. During the afternoon peak hour, queuing on the Flowerdale Road approach to Hoxton Park Road reached Smith Crescent approximately every fifth traffic signal cycle. There were sufficient opportunities for vehicles from Smith Crescent to turn into Flowerdale Road. In the morning, queuing was never observed to reach Smith Crescent.	

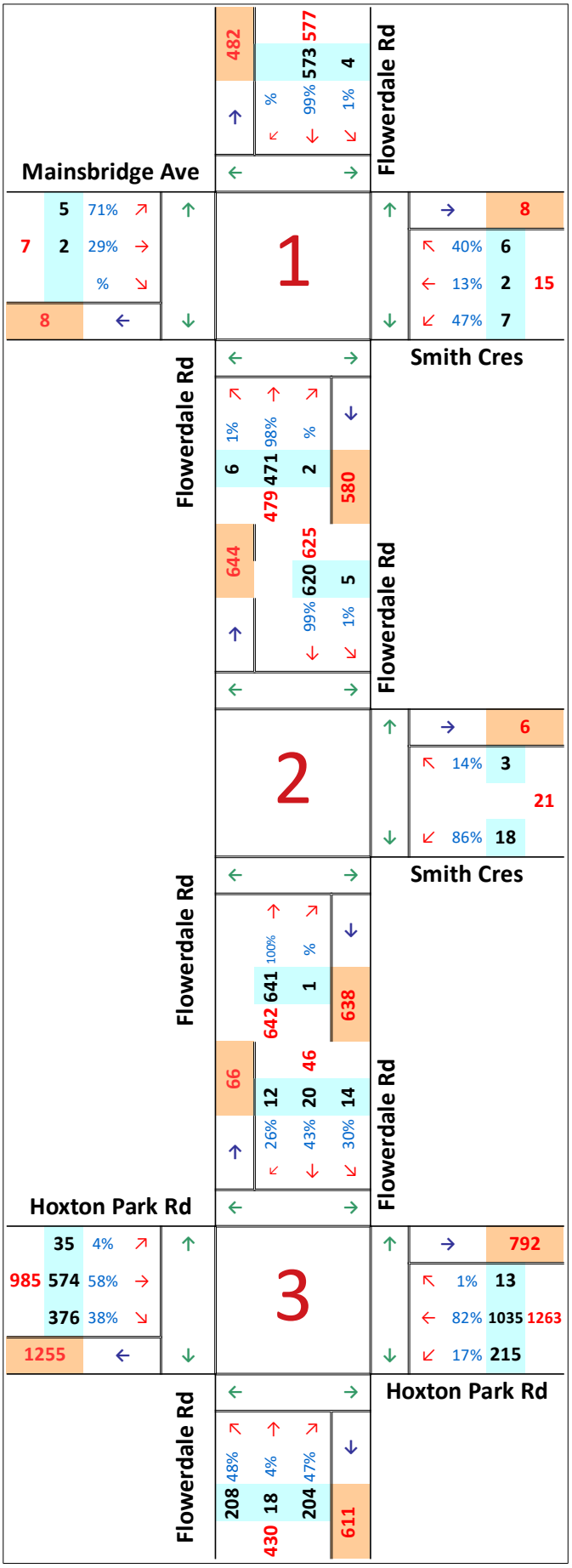


Figure 5a. Existing Traffic Volumes – AM peak

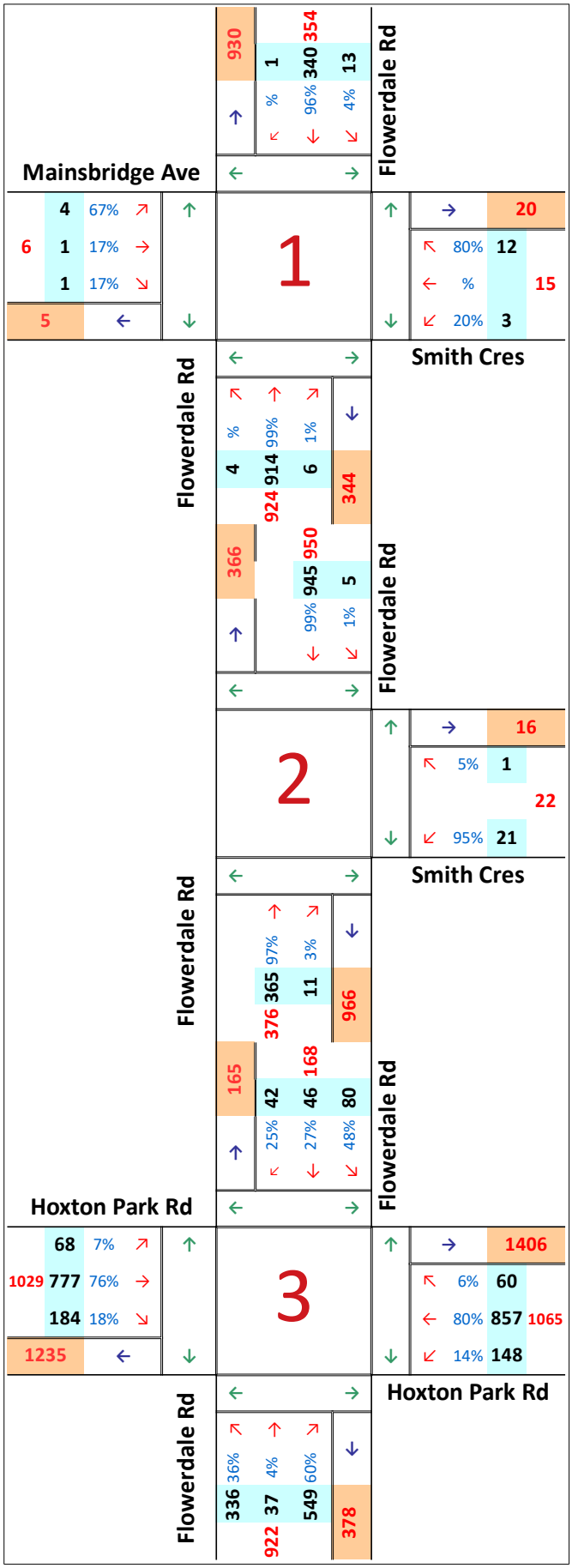


Figure 5b. Existing Traffic Volumes – PM peak

Item	Report
Planning control document 1	• State Environmental Planning Policy (Affordable Rental Housing) 2009 (ARHSEPP 2009) ◦ Division 1 – In-fill affordable housing

Requirement	***Compliance***
SEPP (Affordable Rental Housing) 2009 (ARHSEPP)	
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	Complies
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 proposed**
0.4 spaces per 1 bedroom dwelling • 0.4 x 11 = 4.4, say **4 spaces** 0.5 spaces per 2 bedroom dwelling • 0.5 x 28 = **14 spaces** Total parking spaces required • 4 + 14 = **18 spaces**	Total of 19 spaces Complies with and exceeds Division 1 ARHSEPP requirements It is also noted that there are substantial parking opportunities on the street. Surveys conducted by TEF indicate that there were at least 26 (to a maximum of 44) parking spaces throughout the day within 150 metres walking distance from the site location, without impacting on the current two-way movements. Refer to previous section 'Surveys and survey results' for results and further discussion.

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 (ARHSEPP 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 with AS/NZS series

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 1 in 20 (5%); and	Complies
	3. Measured at 90° to the angle of car parking – 1 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.	Complies
	2. Driveway Crossings should where possible avoid the need to remove existing street trees.	Complies
	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.	Complies
	4. Where a development site has frontage to a Classified Road, the Driveway Crossings should be located on an alternative street.	Driveway located on Smith Crescent Complies
	5. Where a Driveway Crossing is proposed directly from a Classified Road, a deceleration lane may be required.	Not applicable
	6. Locate the entrance at the first Driveway Crossing from the adjacent kerbside lane.	Complies
	7. Avoid a driveway layout, which may result in on-street queuing.	Complies
	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)	Complies
	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.	Complies
	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%.	Complies
	2. Signpost each Driveway Crossing with appropriate entry, exit and keep left signs.	Complies
	3. Decorative Driveway Crossings over the footpath area will only be permitted if it is compatible with the amenity of the locality.	Complies
	4. In business zones any Driveway Crossing shall be compatible with the existing and future paving pattern.	Complies
	Width of Driveway Crossings	
	1. Driveway crossing widths shall be in accordance with tables 5 and 6.	Complies

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

Requirement	*Compliance*
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 • 0.99×2 = 1.98 one way trips, say 2 one way trips (exiting in the morning and entering in the afternoon)
	• **Traffic generated by proposed development** ◦ Refer to **Figure 6.** ◦ High density residential development ▪ AM peak • 0.19 × 39 = 7.4, say **7 trips (in + out)** ◦ 7.4 × 26% = 1.9, say **2 trips in** ◦ 7.4 × 74% = 5.5, say **6 trips out** (**4 additional,** accounting for existing trips) ▪ PM peak • 0.15 × 39 = 5.9, say **6 trips (in+out)** ◦ 5.9 × 66% = 3.9, say **4 trips in** (**2 additional,** accounting for existing trips) ◦ 5.9 × 34% = 2.0, say **2 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.**
Impact on intersection operation	• 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.

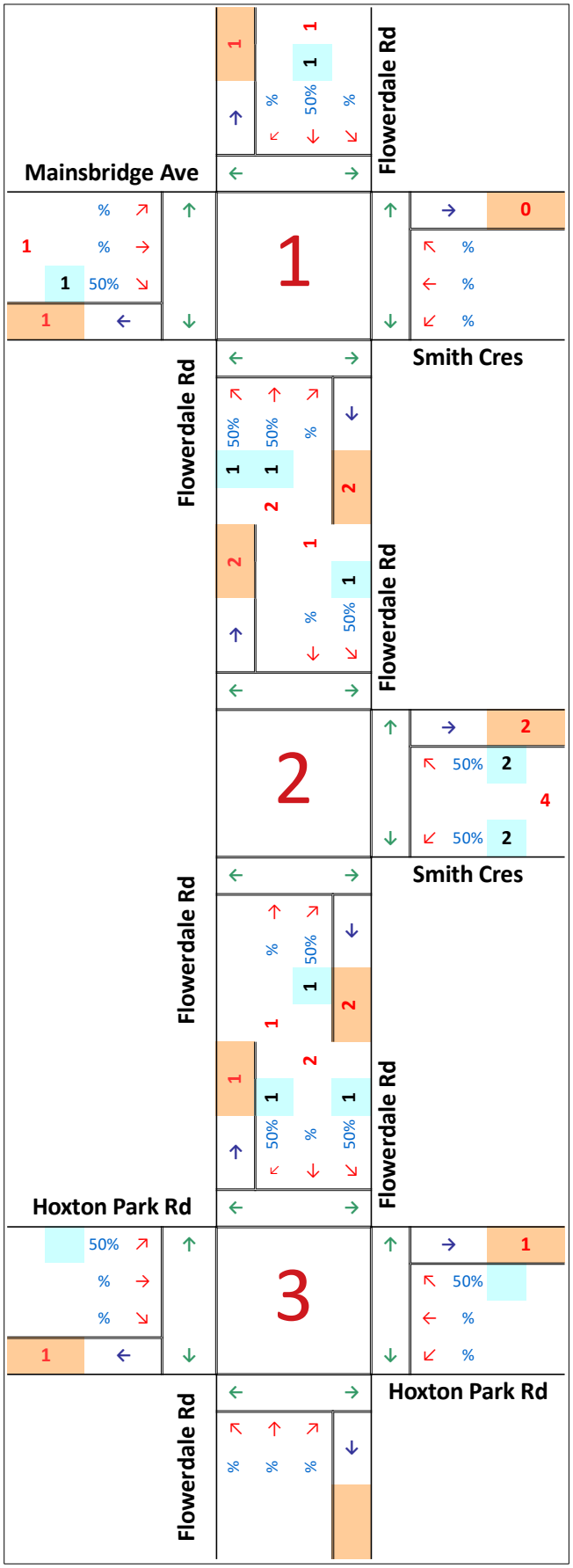


Figure 6a. Distribution of additional traffic volumes – AM peak

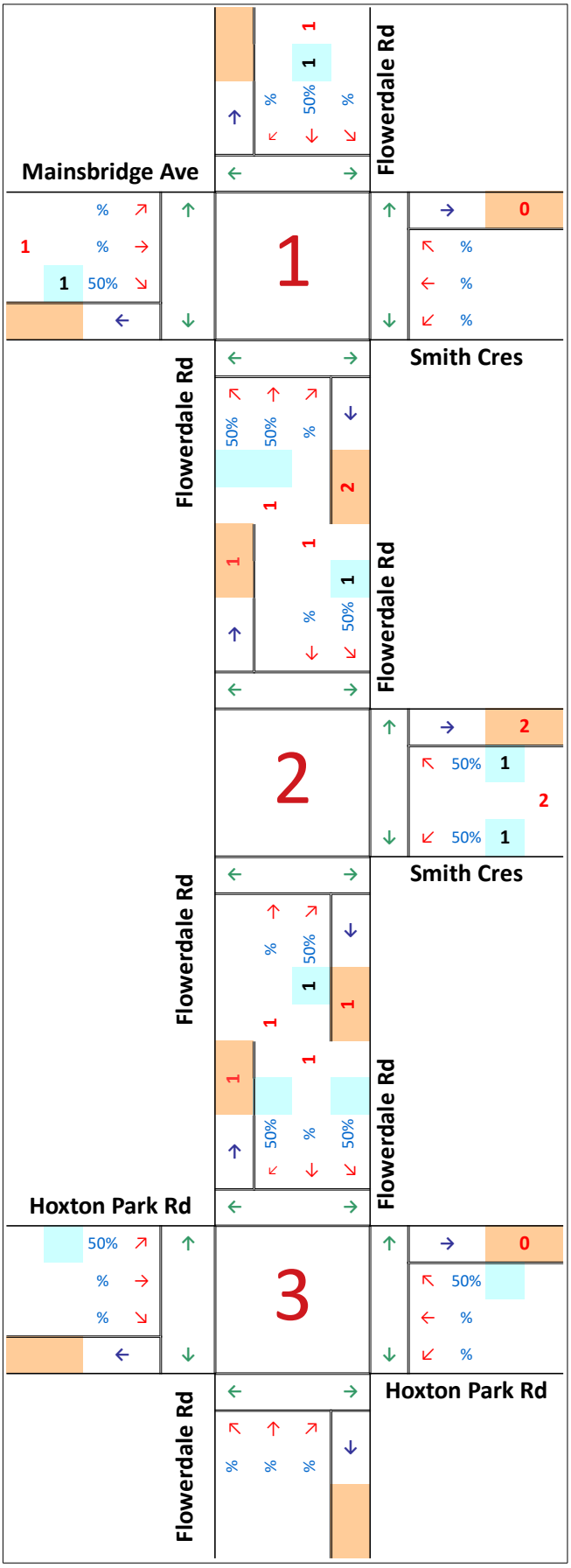
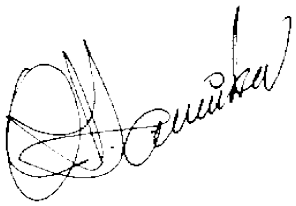


Figure 6b. Distribution of additional traffic volumes – PM peak

Conclusions	• Proposed parking provision ◦ Complies with and exceeds the requirements of State Environmental Planning Policy (Affordable Rental Housing) 2009 for car parking provision. ◦ In addition, more than sufficient parking opportunities exist in the surrounding streets. • Traffic impacts ◦ 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 ◦ Complies with the relevant Standards • The proposed development is supportable on traffic and parking grounds.



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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

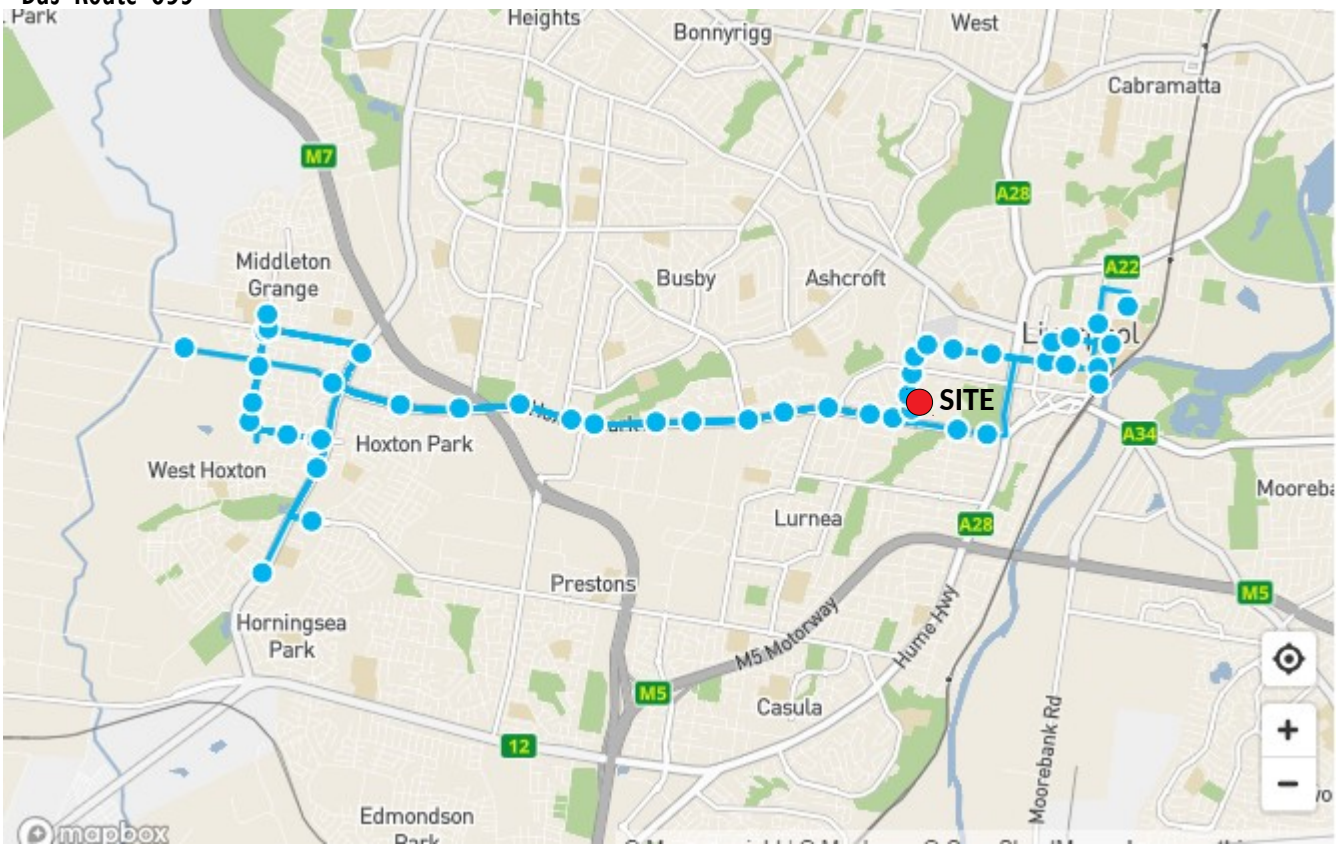
AS/NZS 2890.6:2009: Parking Facilities – Off-street parking for people with disabilities

Appendix

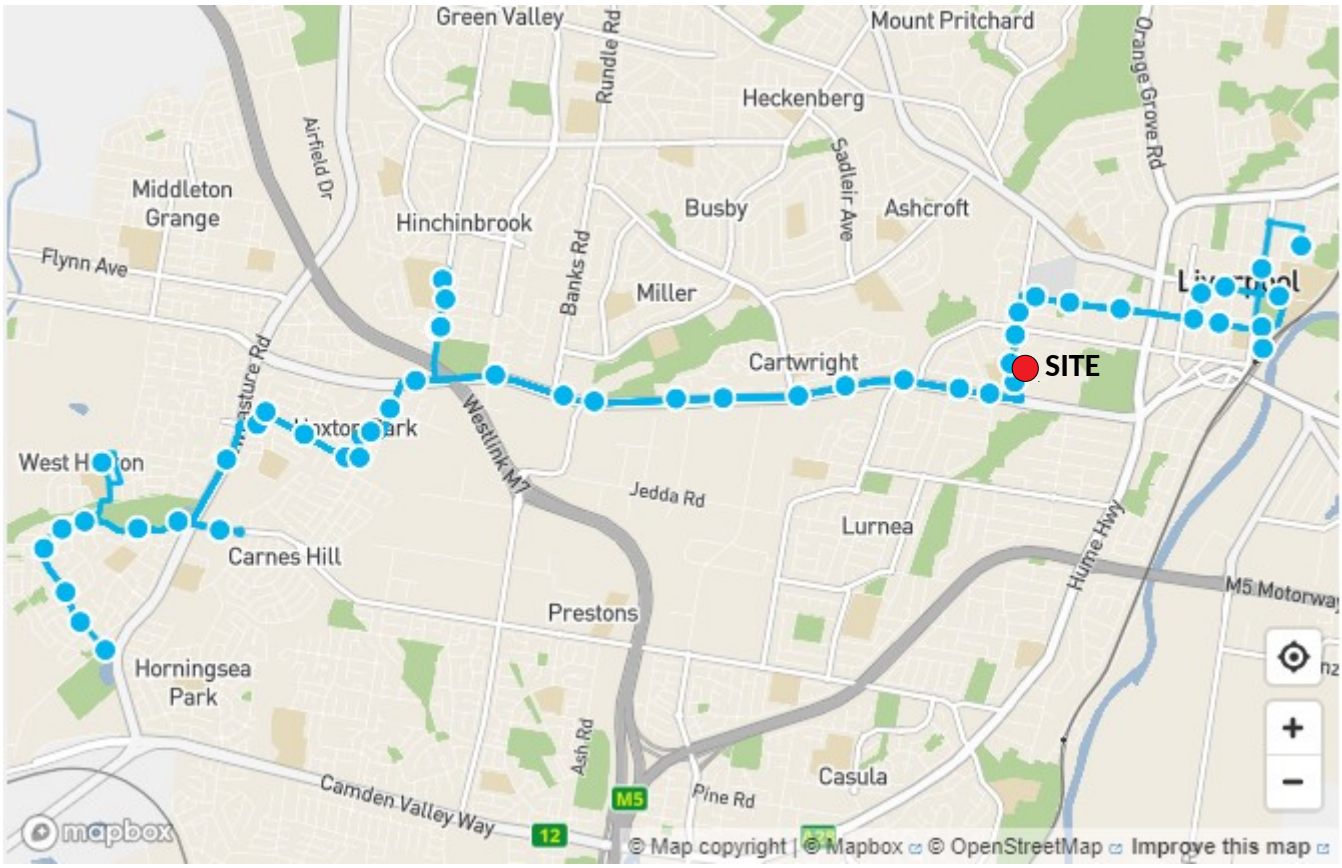
Bus routes

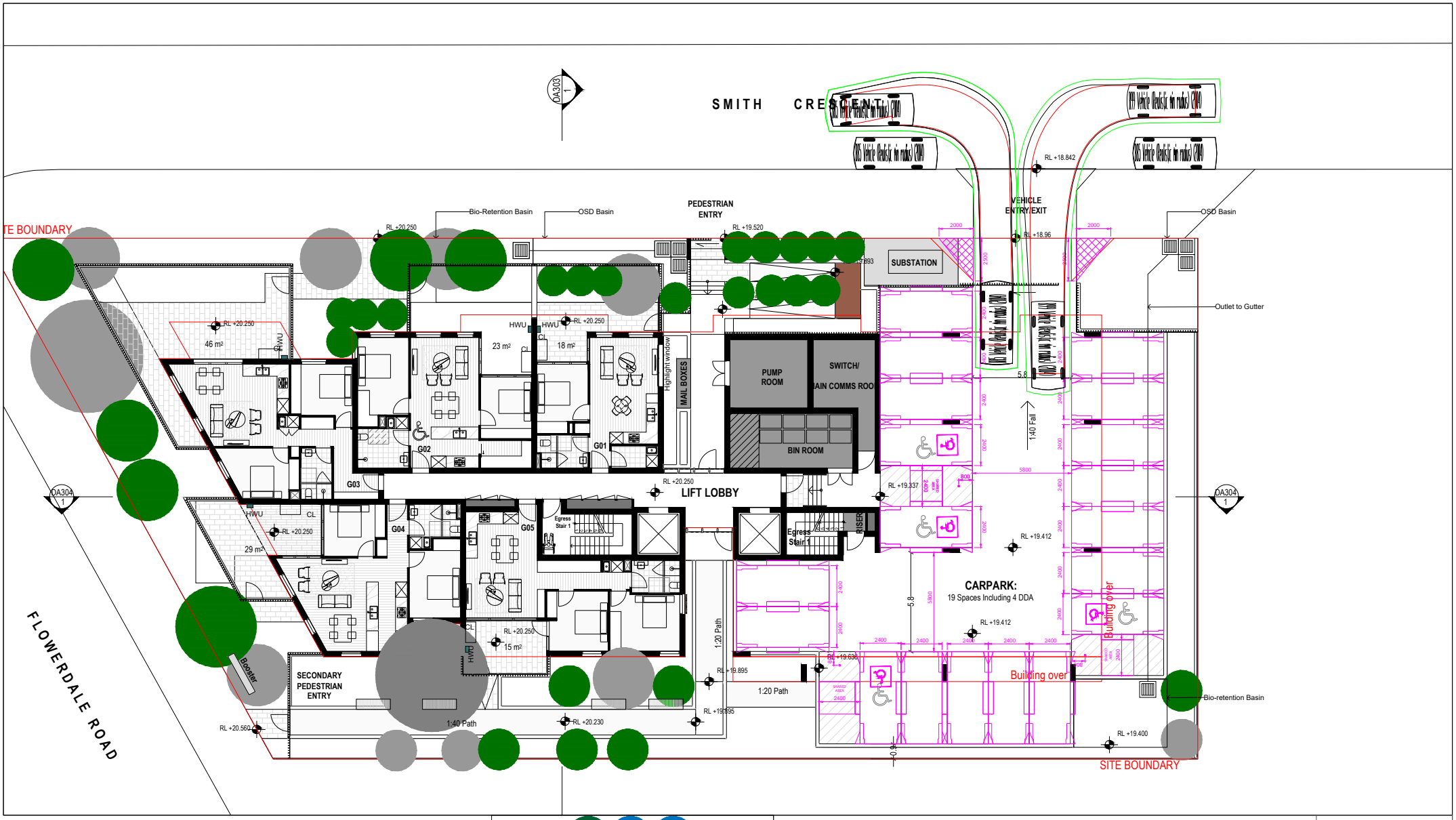
Car park design checks and vehicle turning diagrams

Bus Route 853



Bus Route 854





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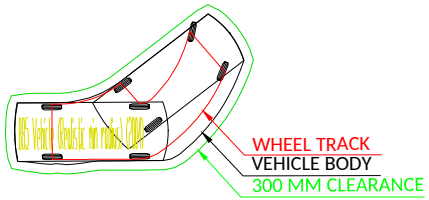

CONSULTING

Dwg No 18116/01 | Rev. B | 21/02/2019

Client:
SGCH

127 - 129 Flowerdale Road, Liverpool, NSW 2170

SCALE 1:300@A4

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

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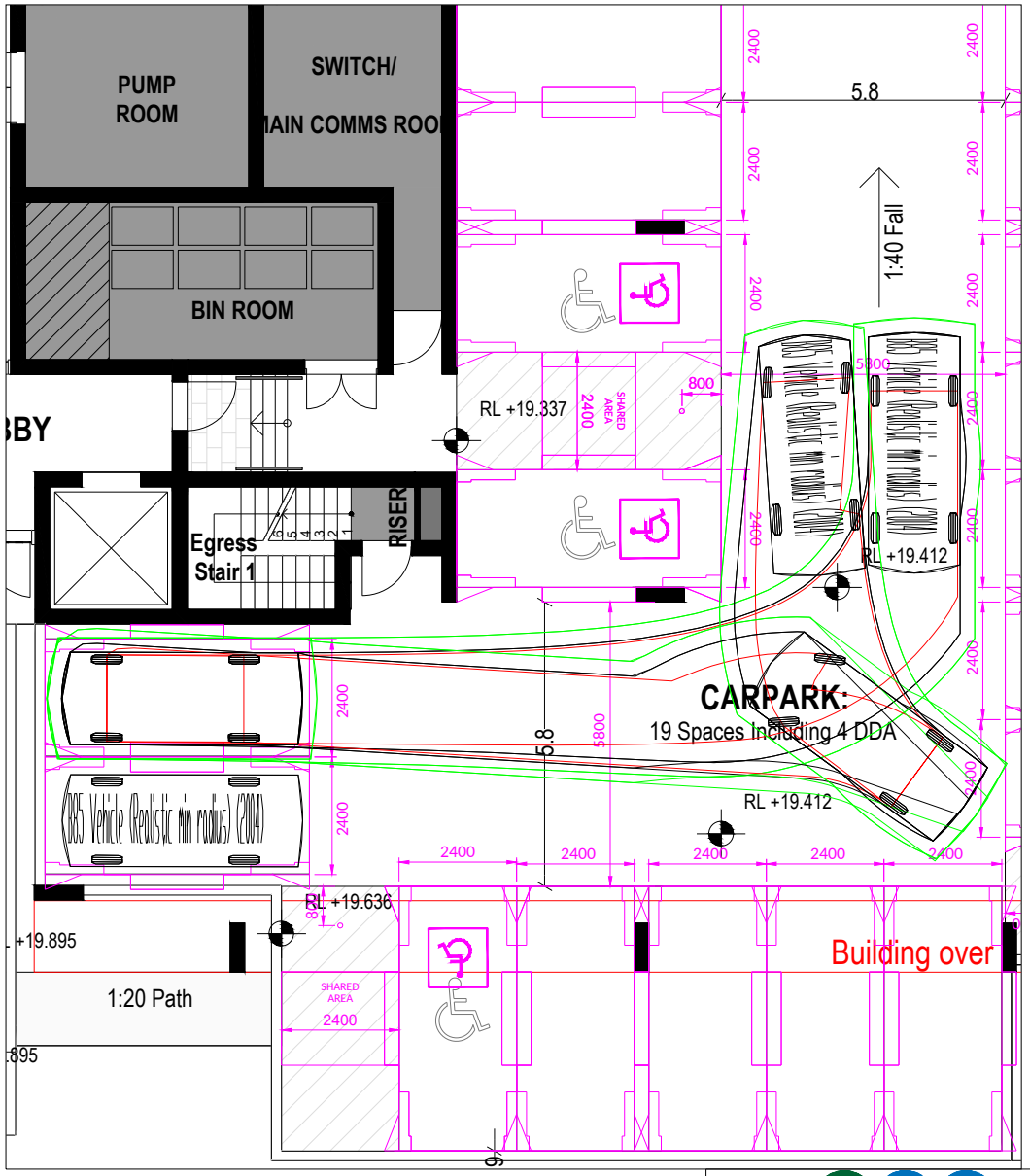

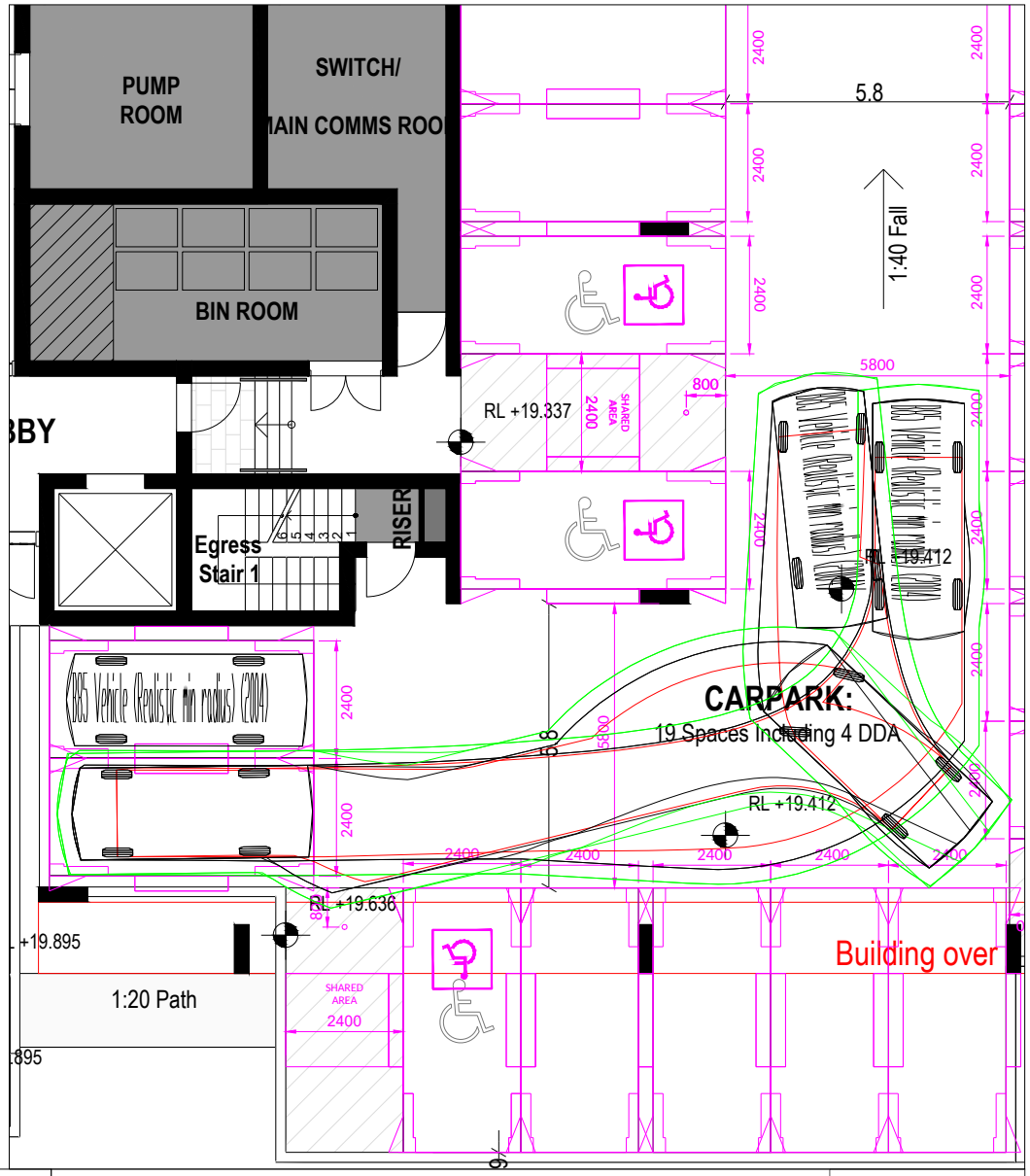

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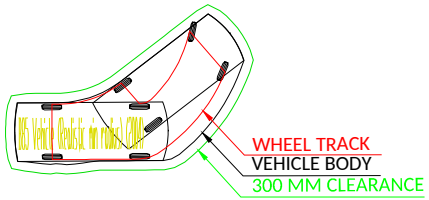

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Dwg No 18116/02 | Rev. B | 21/02/2019

Client:
SGCH

127 - 129 Flowerdale Road, Liverpool, NSW 2170

SCALE 1:150@A4

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

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