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

29 June 2021 Reference: 210155.05FB

Merman Investments
91-101 Hutchinson Street, St Peters NSW 2044
Attention: Polly Priday

LETTER OF ADVICE FOR THE PROPOSED RESIDENTIAL DEVELOPMENT AT 3 WISTON GARDENS, DOUBLE BAY

Dear Polly,

Reference is made to your request to provide a Letter of Advice for the Proposed Residential Development at 3 Wiston Gardens, Double Bay, with proposed plans depicted in **Annexure A** for reference. This letter addresses the reasoning behind the provision for the maximum car parking rates and the design shortfalls with associated alternative basement designs.

1 CAR PARKING PROVISION

The necessary provision of two (2) parking spaces per residential unit and one (1) visitor car parking space is discussed in the following subsections.

1.1 Woollahra DCP Car Parking Requirements

Reference is made to Chapter E1 of the Woollahra DCP 2015 which provides the following maximum car parking requirements for the subject development site.

> *Residential flat buildings, manor houses, multi dwelling housing and multi dwelling housing (terraces)*
>
> *Spaces based on number of bedrooms per dwelling*
>
> *Studio apartment – 0.5 space*
>
> *1 bedroom – 1 space*
>
> *2 bedrooms – 1.5 spaces*
>
> *3 or more bedrooms – 2 spaces*
>
> *Visitors – 0.25 spaces*

The resultant car parking requirement as it relates to the proposal is summarised in **Table 1**.

TABLE 1: WOOLLAHRA DCP CAR PARKING REQUIREMENTS

Land Use	Type	Scale	Maximum Rate	Maximum Parking Permitted	Parking Provided
Residential	3-bedroom	4 units	2 spaces per unit	8	8
	Visitors	4 units	0.25 spaces per unit	1	1

As shown, the parking provision wholly complies with the requirements of Woollahra Council's control. It is noted that the provision of car parking under the DCP control is a maximum, not a minimum, and there is a perceived opportunity to provide fewer car parking spaces for the proposed scale.

1.2 Car Parking Surveys

The resident submissions placed heavy importance on lack of on-street parking in the surrounding streets, particularly Wiston Gardens. *M^CLaren Traffic Engineering* (MTE) has commissioned car parking surveys within Wiston Gardens and within 400m walking distance to the site to further understand the on-street car parking conditions within the area. Surveys were undertaken between 6-9am and 4-7pm on three (3) days, being from Tuesday 1 June to Thursday 3 June 2021, representing typical a typical weekday. Parking data has been separated between parking which is suitable for use by residents and parking which is only suitable for visitors. The car parking data is summarised in **Table 2**, with full data and graphical analysis provided in **Annexure B**.

TABLE 2: ON-STREET CAR PARKING AVAILABILITY

Location	Minimum Parking Availability (% of total)					
	Resident Parking			Visitor Parking		
	1 Jun	2 Jun	3 Jun	1 Jun	2 Jun	3 Jun
0-200m	1 (2%)	4 (9%)	3 (7%)	0 (0%)	0 (0%)	0 (0%)
0-400m	2 (2%)	6 (6%)	4 (4%)	0 (0%)	2 (3%)	2 (3%)

As shown, there is minimal parking suitable for residents and for visitors within the surrounding area.

1.3 Woollahra Resident Parking Scheme

Much of the parking suitable for residents in the surrounding area is signposted as "*2P Permit Holder Excepted*". Under the Woollahra Resident Parking Permit Scheme, residences with fewer than two (2) car parking spaces on site are eligible for a residential parking permit, which allows the registered vehicle to park on the street for an indefinite period.

Table 2 clearly shows that there are minimal car parking spaces available which are suitable for resident vehicles with a parking permit. Additionally, it is clear from the resident submissions that on-street car parking availability is a consideration of great importance. If any parking permits are issued for the residents of the proposal, it would be difficult for them to provide adequate parking within close proximity to the site. Any overflow of residential parking from the subject site would have an adverse impact on the surrounding residents. The provision of two (2) car parking spaces per unit eliminates the resident's eligibility to obtain a resident parking permit, which prevents the adverse impact to the locality.

It has been advised by *Mills Oakley* that Councils cannot prohibit residents from qualification for resident parking schemes. To elaborate, *Mills Oakley* has provided the following evidence to support this claim.

A consent condition that does the following has been rejected by the Land and Environment Court on two prior occasions:

- *prohibiting the participation of owners, tenants and occupiers in any current or future residential parking scheme by stating that they are not eligible to so participate;*
- *saying that all occupants and employees will be ineligible to obtain resident parking permits; and*
- *requiring notice in writing of the prohibition to be given.*

See Rogers v Inner West Council [2018] NSWLEC 1305 at [45]-[58] and So Nash Pty Ltd v Inner West Council [2018] NSWLEC 1327 at [28]-[32].

1.4 Public Transport Level of Service

The site is within 400m walking distance to Double Bay Wharf which provides a ferry service to Circular Quay. Additionally, there is a bus stop which provides service to bus route 328 between Bondi Junction and Darling Point. Each of these public transport services have a level of service of "D" during the peak hours and "E" during interpeak, which is discussed in detail in **Annexure C**. The low level of service is unattractive to certain users and would not likely be relied upon as a replacement for a private vehicle.

1.5 Demographic Study

Reference is made to the *Demographic Study* prepared by *City Plan*. *Figure 5* within the report makes a projection of the age demographics in Double Bay from 2016-2041. The relevant excerpt of *Figure 5* is provided in **Figure 1** of this report.

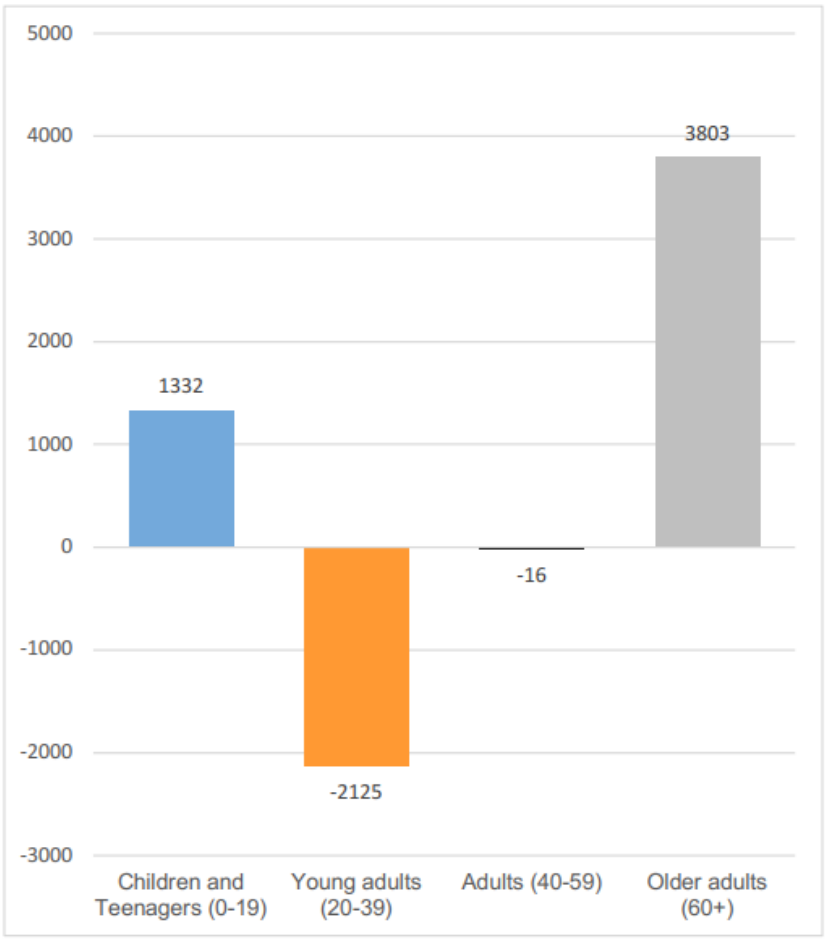


Figure 5: Projected change in age structure of Woollahra LGA (2016-2041) (Source: DPIE 2019 population projections)

FIGURE 1: *FIGURE 5* OF *CITY PLAN DEMOGRAPHIC STUDY*

As shown in *Figure 5* of the City Plan study, there is expected to be an increase in the number of children and young families, as well as a significant increase in older adults (60+). These two demographic groups are more likely to rely on private vehicles than young adults (20-39) or adults (40-59).

Young families living in 3-bedroom apartments are likely to rely on at least two (2) vehicles and would therefore require two (2) car parking spaces per unit. Older adults (60+) are not regular public transport users, particularly when the locality has poor access to public transportation. Additionally, the Study states that *49% of people aged 65 and over have a disability*. Two (2) standard car spaces can easily be adapted to a disabled or adaptable car parking space, which is wider than a standard single car space. Therefore, the provision of two (2) standard car spaces per unit provides the ability for a senior or a person with a disability to "age-in-place".

1.6 Visitor Car Parking

Given the constrained on-street parking availability for visitors in the area, it is highly desirable to have a visitor space on the site. Visitors for the development not only includes social visits, but also short term stays for gardeners, cleaners, maintenance, tradespeople, and at-home carers for seniors or children. These types of visitors generally carry bulky equipment and have a length of stay of longer than two hours. These visitors would greatly benefit from having visitor parking on the site given the 2-hour parking restrictions and low availability in the surrounding streets.

1.7 Summary

The provision of two (2) car parking spaces per unit and a visitor parking space for the subject development has been reviewed. The following conclusions have been made:

- The car parking provision complies with the Woollahra DCP.
- On-street parking is considerably strained within the area, and the provision of fewer than two (2) spaces per unit would adversely impact the locality.
- Residents of the area are not likely to rely upon public transportation as a replacement for reliance on a private vehicle.
- The demographic projection of Double Bay shows an increase in young families and older adults, who are more likely to rely on two (2) car parking spaces than young adults or adults (20-59 years).
- Two (2) car parking spaces can be easily converted into a single adaptable car parking space, allowing seniors and people with a disability to “age-in-place”.
- The visitor parking space provides a reliable space for visitors who carry bulky equipment and stay longer than two hours, such as cleaners, tradespeople, maintenance and gardeners.

The provision of two (2) car parking spaces per unit and one (1) visitor space is therefore the best parking outcome for residents of both the proposed development and the locality.

2 CAR PARKING DESIGN

As discussed, it is necessary to provide (9) compliant car parking spaces to meet the anticipated site demand. As a result, the basement and ground level car parking areas were carefully designed to achieve the target provision whilst navigating the site's constraints, being the height limit constraints and the resultant lift location. The constraints are shown in **Figure 2**.

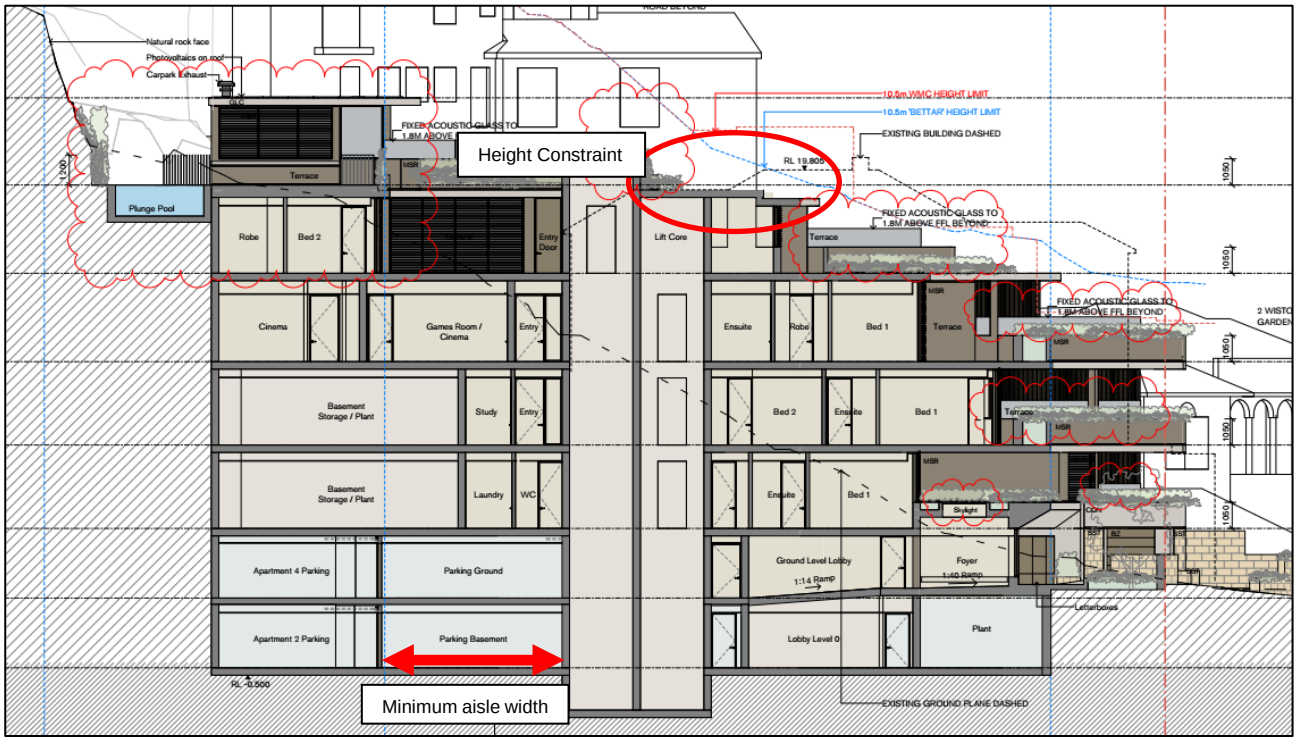


FIGURE 2: LIFT LOCATION DESIGN CONSTRAINTS

The lift core location is the key design component. Parking needs to be provided at the rear of the site so that the pedestrian and vehicle traffic is wholly separated for safety and security purposes. Pedestrians have their own entry from Wiston Gardens which provide access to the stairwell and lifts without requiring pedestrians to navigate vehicular manoeuvring areas. For this reason, the lift core is placed as close to the front of the site as practicable to limit excavation whilst satisfying the height limit constraint. The parking areas have been designed to the minimum dimensions to limit the extension of the basement toward the rear of the site. This design achieves a compliant parking layout with an acceptable level of convenience for car parking.

It is understood that the car parking design results in a non-compliance with the rear setback. In response, MTE has assessed several alternative parking designs in an attempt to comply with the rear setback control, or at least significantly reduce the non-compliance. The alternative designs are discussed in the following subsections.

2.1 Reduction in Aisle Width

The car park has an aisle width of 7.4m, which strictly speaking is in excess of the minimum aisle width set out in *AS2890.1:2004*, which is 6.1m in this instance. Theoretically, the basement footprint could be reduced from the rear of the site by 1.3m, which is the difference in aisle width between the proposed and the minimum allowable by the standards.

The extra aisle width is required because the circulation roadway approaches the aisle at a 90-degree angle and therefore requires a vehicle to turn a 90-degree corner prior to entering the car parking aisle. In contrast, the aisle width requirements set out in AS2890.1:2004 are based on a

vehicle approaching a space via an aisle which is perpendicular to the car space. Swept path tests have been prepared to demonstrate the need for the additional aisle width. The parking spaces for Apartments 2 and 4 are not able to be accessed in a compliant number of manoeuvres. In some cases, parking a second car in the double garage would result in a collision with the vehicle already parked in the garage. Detailed swept path results are provided in **Annexure D**, however an example is provided in **Figure 3** and **Figure 4** below.

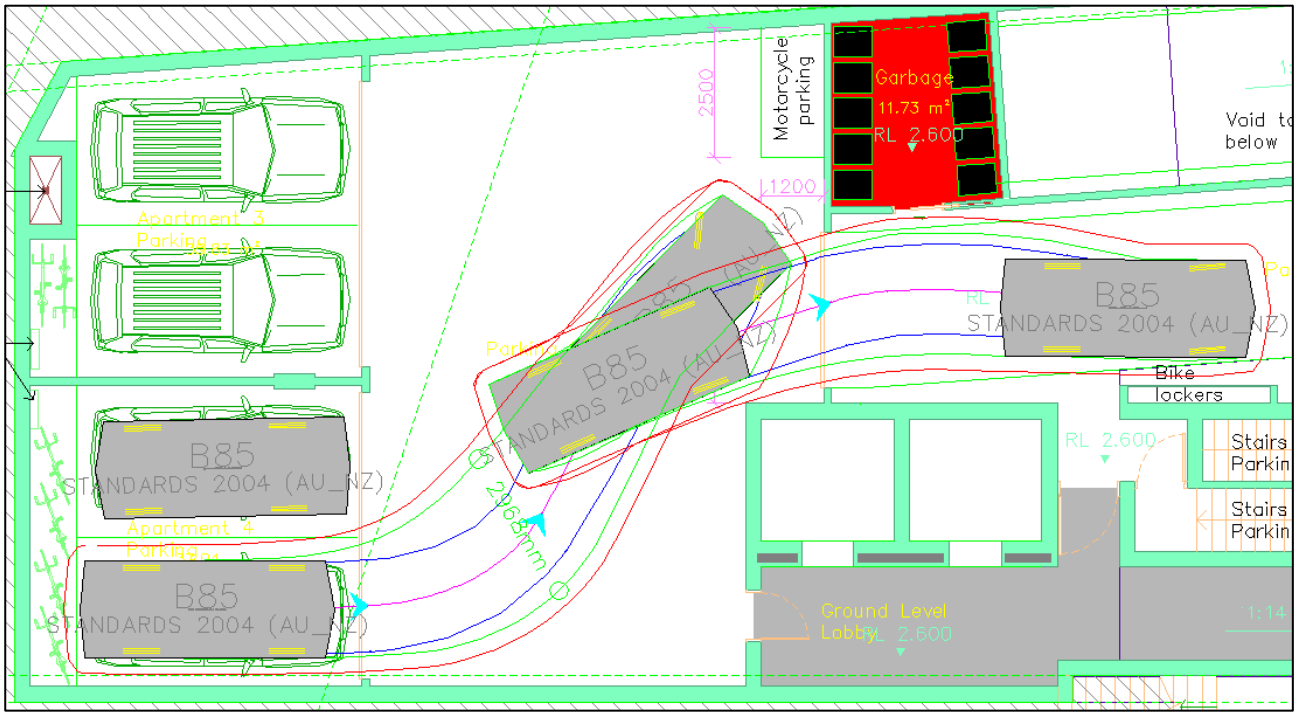


FIGURE 3: PROPOSED AISLE WIDTH EXIT – 3 MANOEUVRES

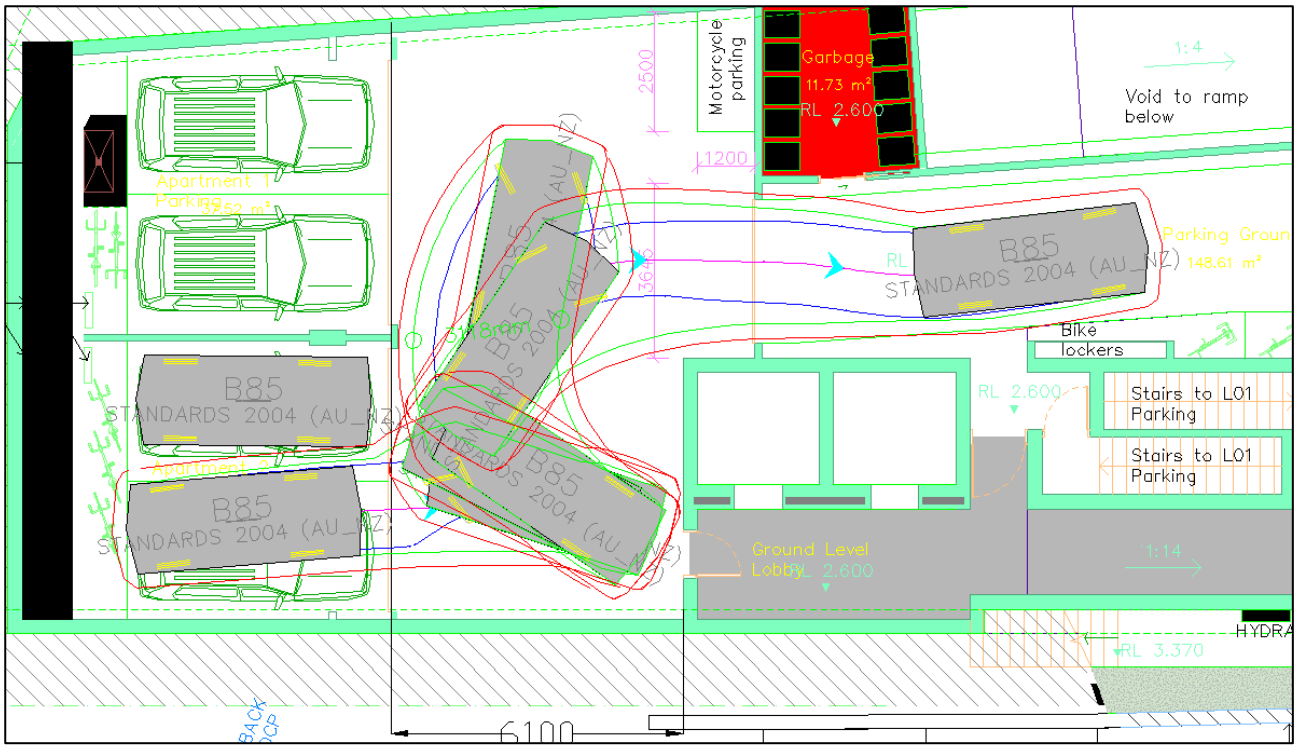


FIGURE 4: REDUCED AISLE WIDTH EXIT – 6 MANOEUVRES

The movement in **Figure 4** has an unacceptable level of inconvenience and is therefore not supported.

2.2 90-Degree Angled Car Parking

Another option to reduce the basement extent is to provide the parking at a 90-degree angle to what is proposed. This reduces the need for a vehicle to turn around 180-degrees to enter and exit the parking spaces. The determining factor for the basement excavation changes to the width of enclosed garages in this scenario, rather than aisle width and parking space length for the proposed scenario. The minimum allowable width between the lift core and the car park exhaust is 12m. This includes:

- 2 x 5.4m width enclosed garages
- 2 x 100m walls for enclosed garages
- 1 x 1.0m length blind aisle extension
- Total = 10.8m + 0.2m + 1m = **12m**

This distance in the proposed is 12.9m. So, this basement layout concept theoretically could reduce the basement extent by 900mm. Firstly, this reduction is minor and would not result in a significant reduction in the rear setback non-compliance. However, the larger issue with this design concept is similar to that of the previous alternative. The design requires vehicles to undertake an excessive number of manoeuvres to enter and exit car parking spaces. Detailed swept path analysis is provided in **Annexure D**, however, an example of the inconvenience is provided in **Figure 5**.

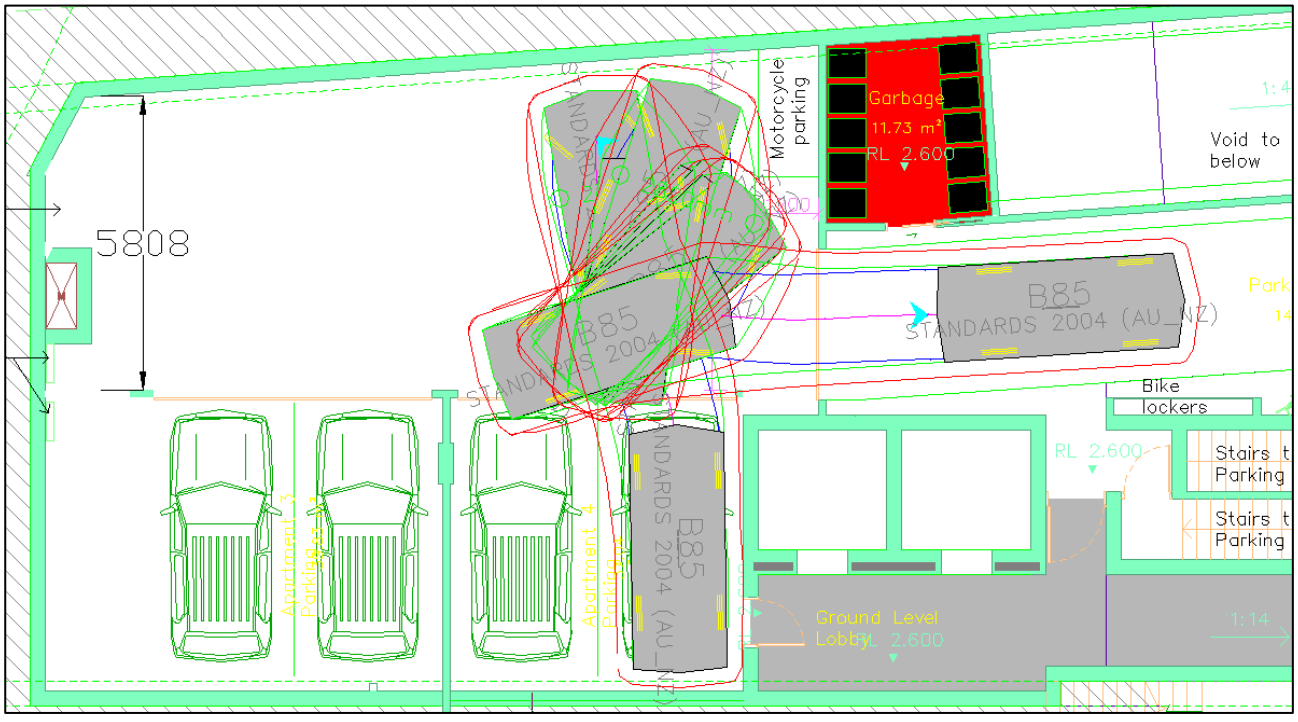


FIGURE 5: EGRESS FROM SITE – 9 MANOEUVRES

Egress from this car parking space would take a vehicle 9 manoeuvres to complete. This is an unacceptable level of inconvenience, and this design concept is therefore not supported.

2.3 Compliance with the Rear Setback

MTE has assessed a design where the parking is wholly provided within the rear setback boundary. **Figure 6** and **Figure 7** below show the car parking arrangement that would be required given maximum ramp gradients and minimum aisle widths. The area which the ramp takes up results in a level change of 2.5 metres. The splay at the bottom is required to allow vehicles to physically enter and exit the furthest south car parking space, as shown in **Figure 6**.

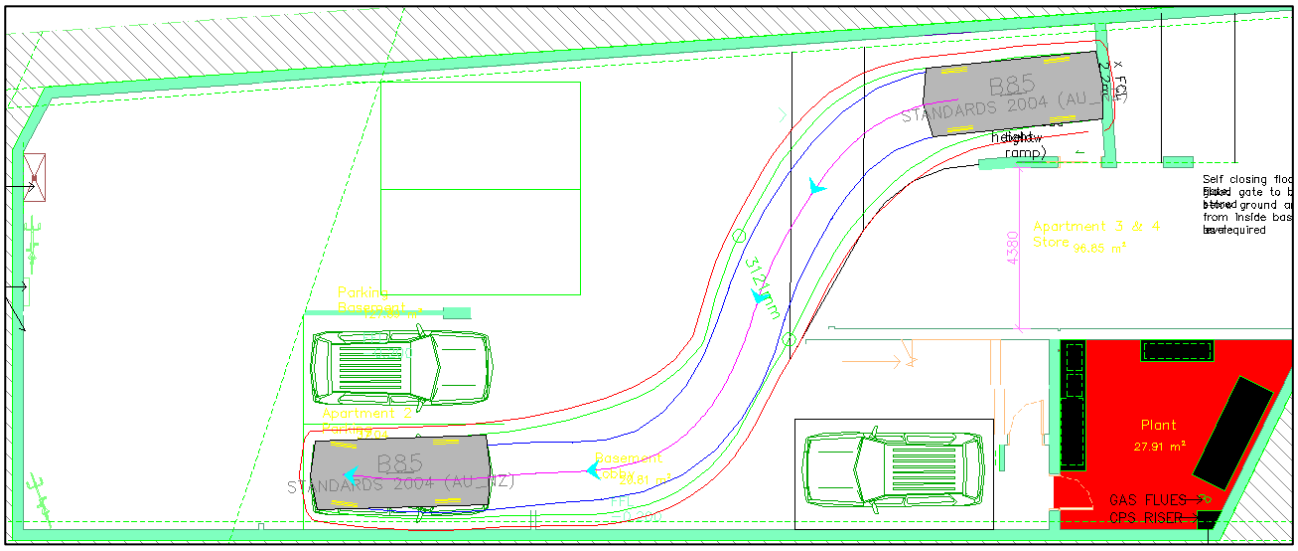


FIGURE 6: BASEMENT LEVEL – REAR SETBACK COMPLIANCE

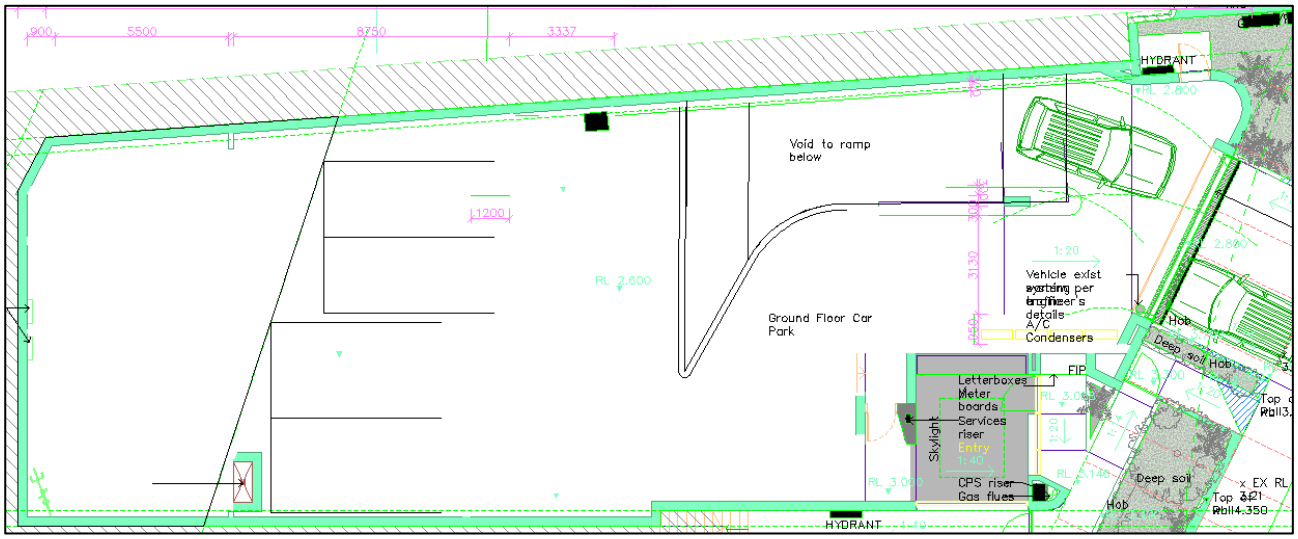


FIGURE 7: GROUND LEVEL – REAR SETBACK COMPLIANCE

This design has obvious drawbacks, not only for other disciplines, but also for traffic and parking. The drawbacks are discussed in the following subsections.

2.3.1 Inconvenient car parking

Similar to the previous concepts, it is not possible to enter and exit all car parking spaces in an acceptable number of manoeuvres. An example of this is provided in **Figure 8** and **Figure 9**, which shows a B85 vehicle entering and exiting the most inconvenient car parking space in a total of 9 manoeuvres.

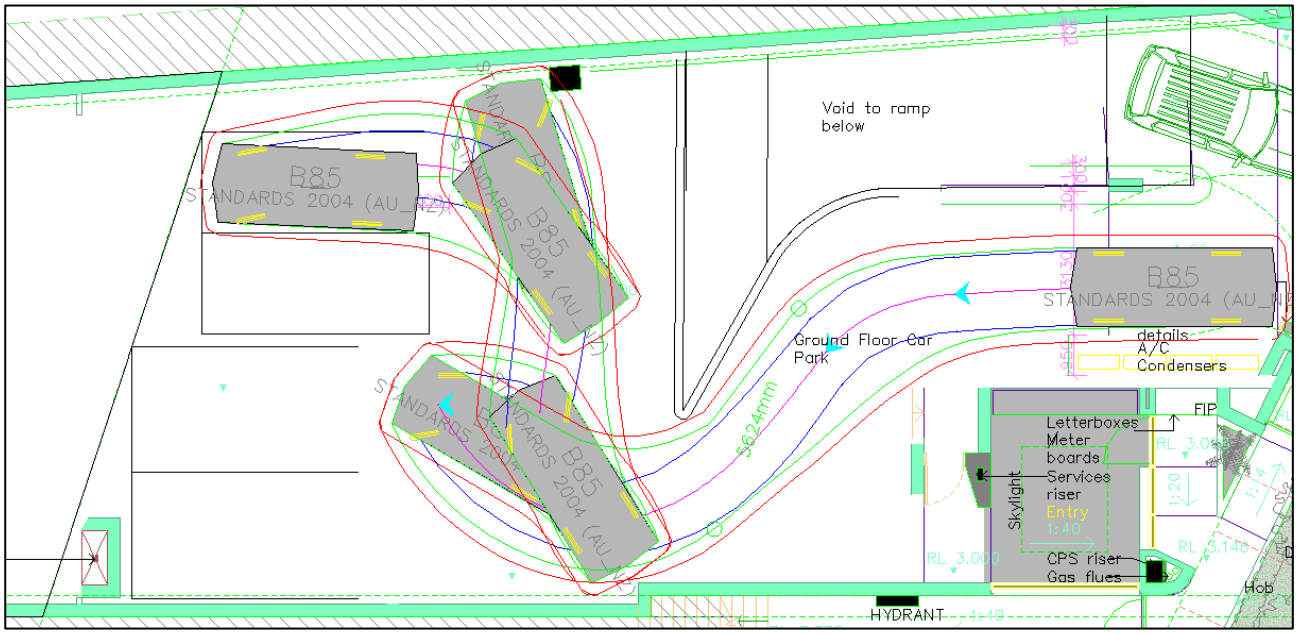


FIGURE 8: ENTRY PATH – 5 MANOEUVRES

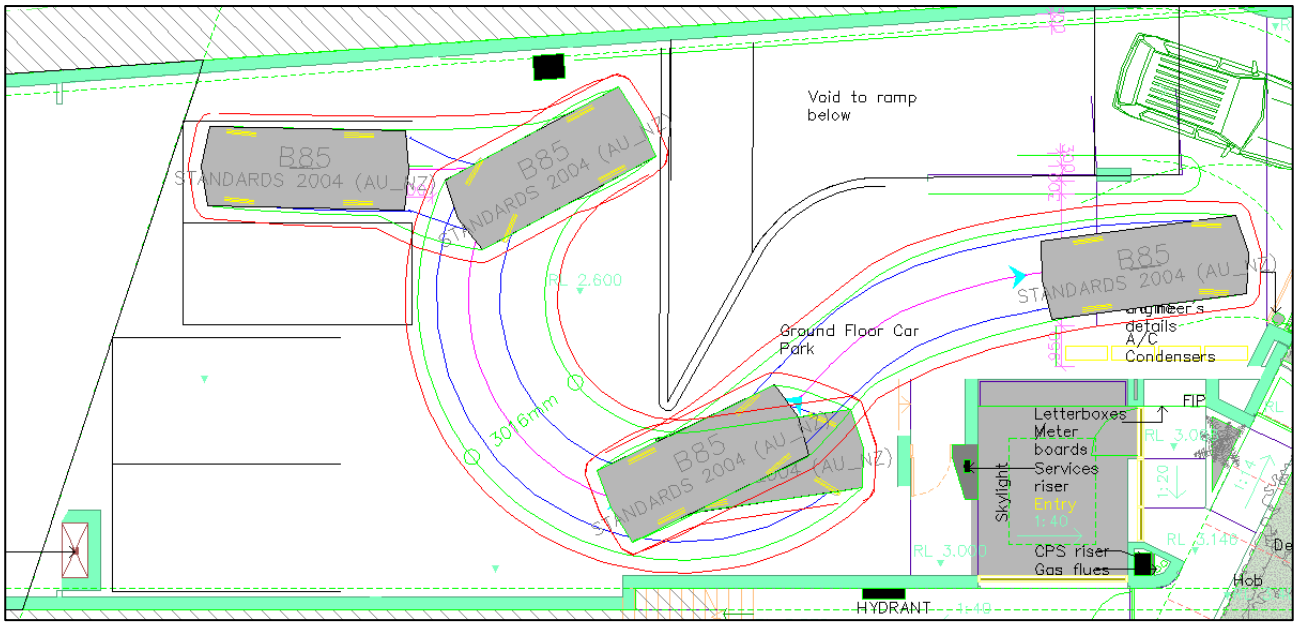


FIGURE 9: EXIT PATH – 4 MANOEUVRES

Although a vehicle can physically enter and exit the site in a forward direction, the path into and out of the parking space is unacceptable given it takes a total of 9 manoeuvres to enter and exit the site in a forward direction.

2.3.2 Loss of all lifts and stairwells

The passenger lifts and the stairwell were deleted to provide the car parking (and access thereto) within the rear setback. This removes all pedestrian connection between the ground floor/basement and the apartments above.

2.3.3 Steep ramp gradients

The ramp gradients have been increased to their maximum to provide a compliant aisle width. This ramp is compliant for a B99 vehicle but would likely not be acceptable for luxury vehicles, lowered vehicles or imports which are typical in the area.

2.3.1 Slab to Slab Height Clearance

The ramp drops a total of 2.5m in height over a length of 12m. Given the minimum allowable headroom is 2.2m for vehicles within the basement, there would only be 300mm remaining for the ground floor slab thickness and services. Although this is outside MTE's area of expertise, it is considered unlikely that 300mm would be sufficient for all necessary service conduits as well as the ground floor slab.

3 SUMMARY

This letter of advice has discussed the subject site's anticipated car parking demands and has addressed the shortfalls of alternative designs. The following points are relevant to note.

- The car parking provision complies with the Woollahra DCP and is the best outcome for the constrained on-street parking conditions within the area.
- The car parking provision avoids causing an adverse impact on the locality.
- The car parking provision caters for the anticipated needs of the specific characteristics of Double Bay residents.
- The proposed design limits the building footprint as much as practicable.
- Alternative design solutions such as angled parking, reduced aisle widths and strict compliance with the rear setback are inconvenient and have an unacceptable impact on other disciplines.

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

Yours faithfully,
McLaren Traffic Engineering

Craig McLaren
Director
BE Civil, Grad Dip (Transport Engineering), MAITPM, MITE
RPEQ 19457
RMS Accredited Level 3 Road Safety Auditor [1998]
RMS Accredited Traffic Management Plan Designer [2018]

ANNEXURE A: PROPOSED PLANS

(1 SHEET)


Tzannes
John Keith
Polly Friday
City Plan
Roger Jasprizza, Oculus
IGS
Stephen Davies, Urbis
1 : 100 @ A1 (Double @ A3)
Wiston Gardens Double Bay
3 Wiston Gardens
Double Bay, NSW 2028
FOR DEVELOPMENT APPLICATION
Basement and Ground Level Plans
13/12/19
CD
TZ
19029
1000
Q
1 Basement Carparking 1 : 100
2 Ground Lobby & Carparking 1 : 100
2 WISTON GARDENS
5A WISTON GARDENS
19A EASTBOURNE RD
19 EASTBOURNE RD
17 EASTBOURNE RD

ANNEXURE B: CAR PARKING SURVEY DATA
(8 SHEETS)

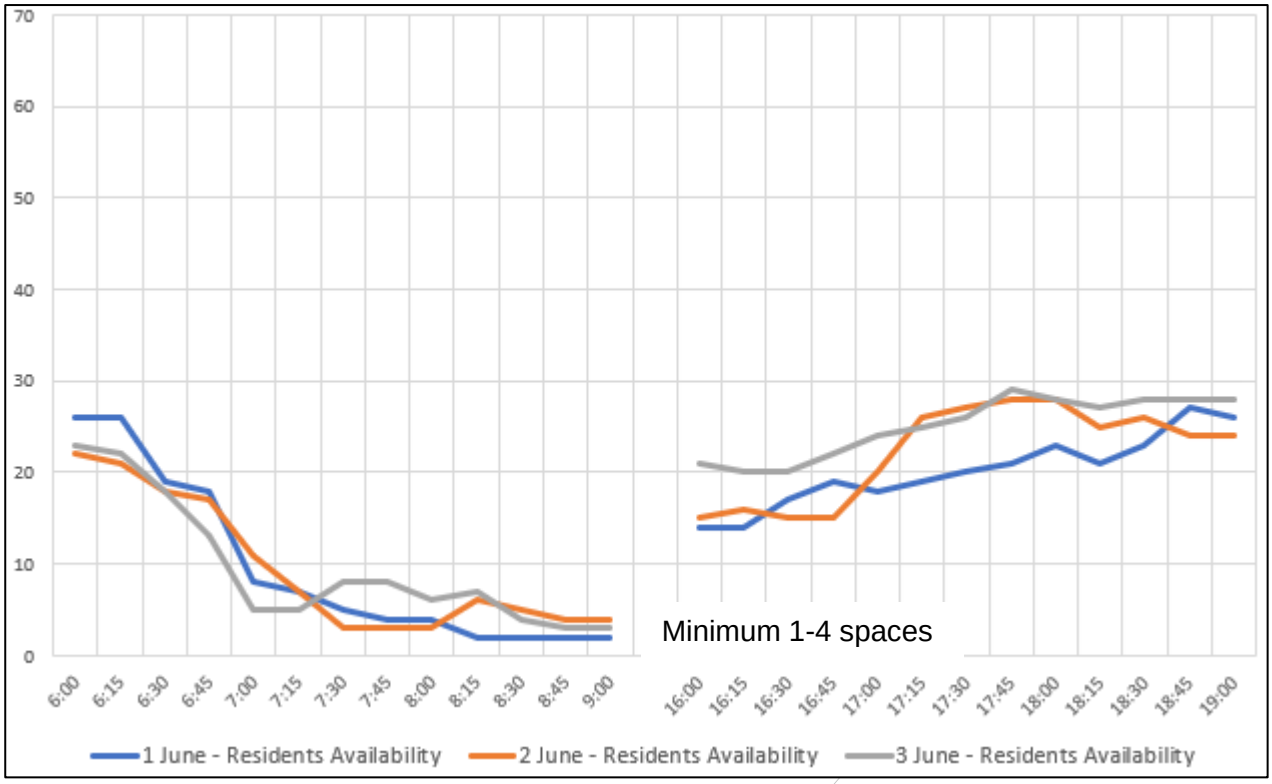


FIGURE 10: RESIDENT PARKING AVAILABILITY – 200M WALKING DISTANCE

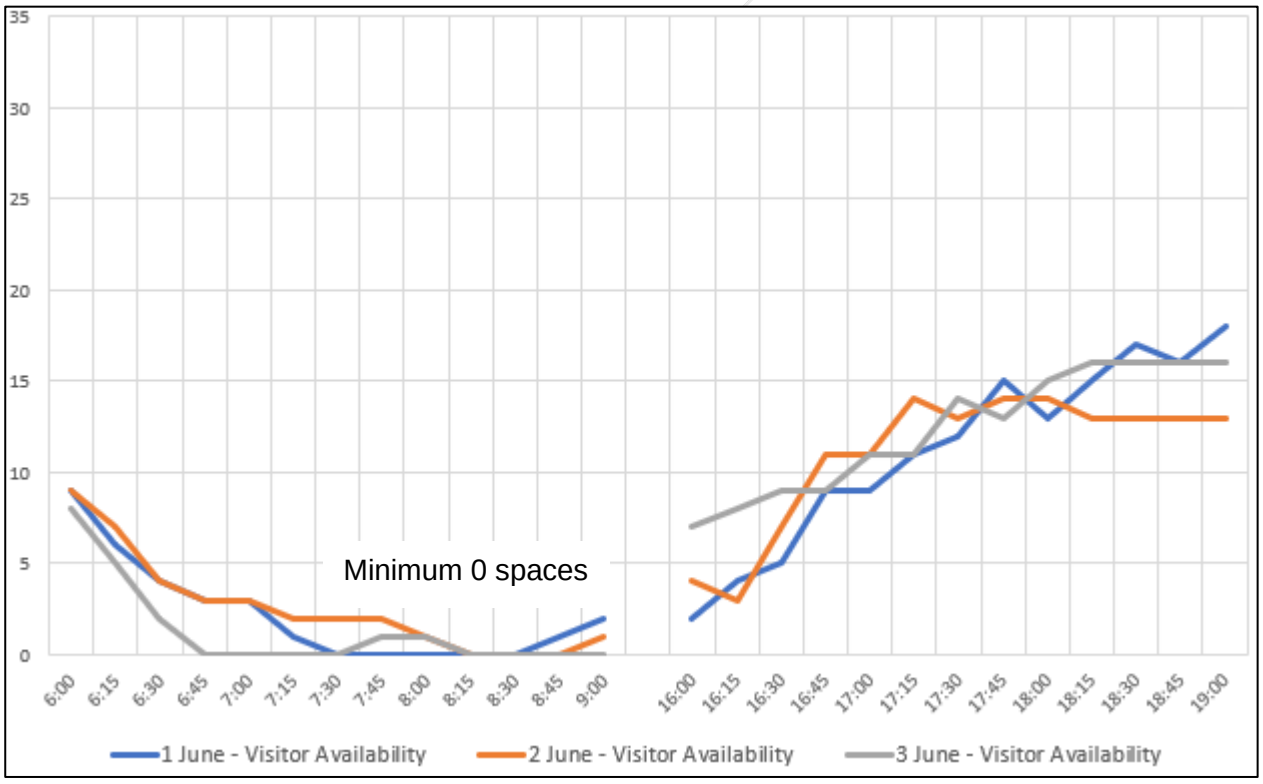


FIGURE 11: VISITOR PARKING AVAILABILITY – 200M WALKING DISTANCE

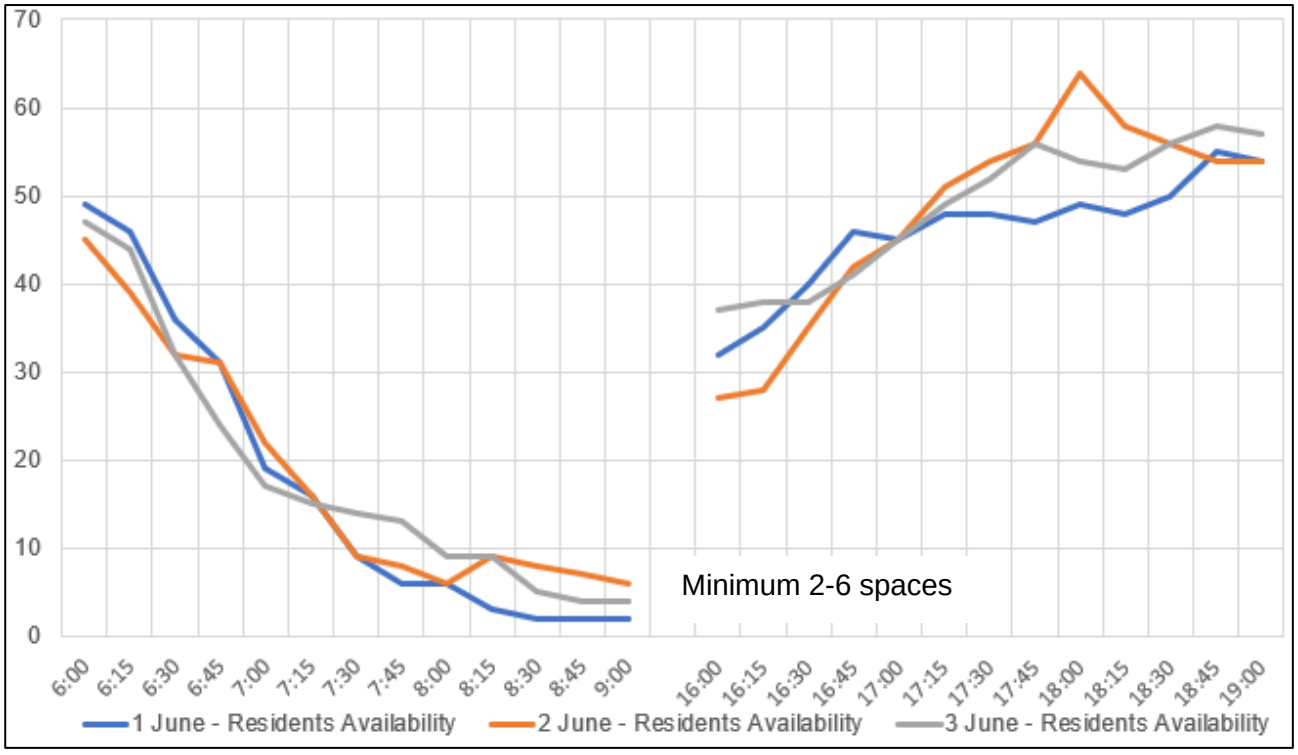


FIGURE 12: RESIDENT PARKING AVAILABILITY – 400M WALKING DISTANCE

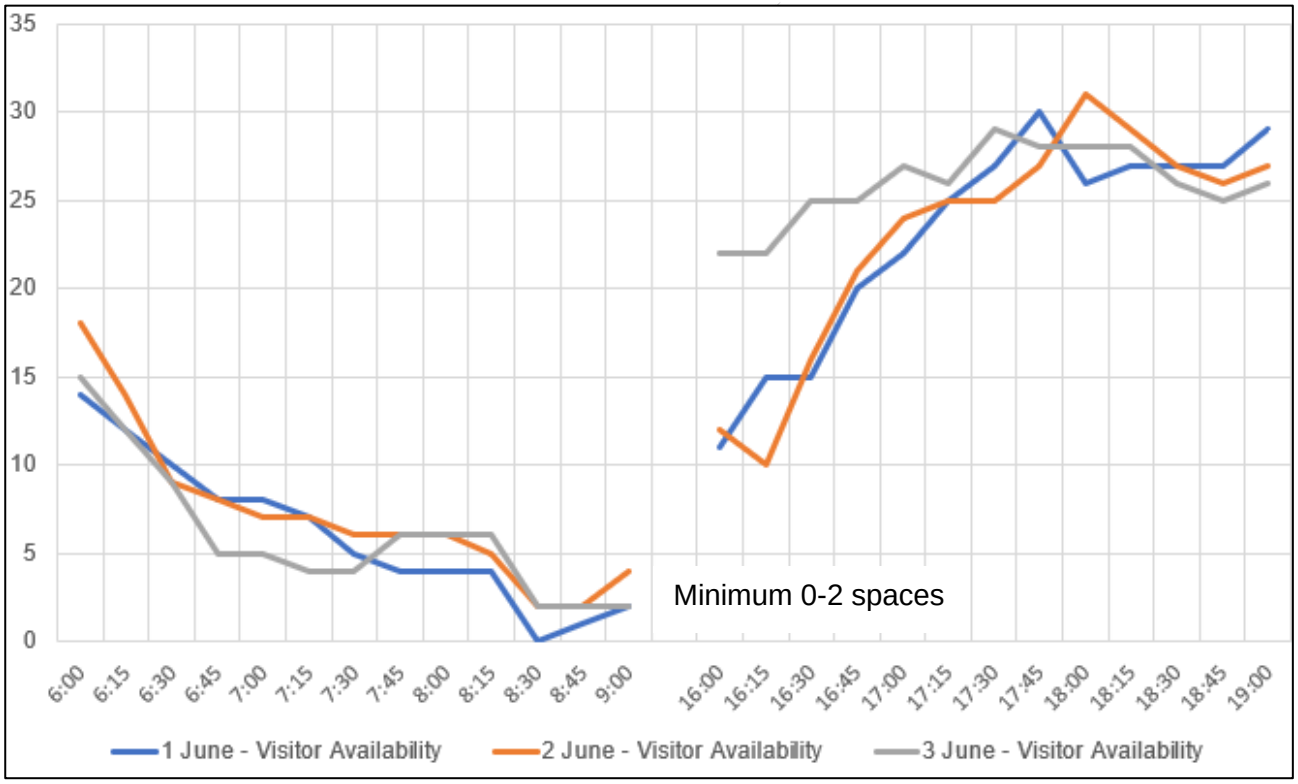


FIGURE 13: VISITOR PARKING AVAILABILITY – 400M WALKING DISTANCE

Curtis Traffic Surveys

Job: 210601mcl (21_0155)

Client: McLaren Traffic Engineering

Day, date 1/06/21

Location: Double Bay

Weather Fine

Surveyor MC

Parking round commencing…

Zone	Street	From	To	Side of Street	Capacity	Restriction	6:00	6:15	6:30	6:45	7:00	7:15	7:30	7:45	8:00	8:15	8:30	8:45	9:00
a	Wiston G	end	Marine P	west	6	u	6	4	4	4	8	9	9	8	8	8	8	6	6
b	Wiston G	end	Marine P	east	10	2r3	3	3	7	8	8	8	8	8	7	8	8	8	8
c	Marine Pd	Wiston G	Ocean A	north	10	10p1	7	8	8	9	9	10	10	10	11	11	10	10	10
d	Marine Pd	Wiston G	Ocean A	south	6	2r3	2	3	4	6	6	6	6	6	6	6	6	6	6
e	Ocean Av	Marine Pd	William S	east	20	10p1	14	16	18	18	18	19	20	20	20	20	20	19	18
f	Ocean Av	Marine Pd	Marathon M	west	16	z7	7	8	10	8	13	14	15	15	16	15	15	14	14
g	William St	Ocean Av	Bay St	north	19	bz2+1car	15	14	13	14	14	13	14	14	14	14	14	14	14
h	Bay St	William St	end	west	15	is	13	13	14	14	14	14	14	15	15	15	15	15	15
I	Bay St	end	William S	east	12	2r3	6	8	9	11	11	10	10	10	10	11	12	13	13
j	William St	Bay St	Ocean A	south	16	4+3*bz5+4*	3	4	5	6	7	7	7	9	9	10	9	8	7
k	Ocean Av	William St	Cross St	east	6	4u+2*2r3	5	5	6	6	6	6	6	6	6	6	6	6	6
l	Cross St	Ocean Av	No 67	north	12	*2r3	2	2	2	2	1	1	2	2	2	2	3	4	5
m	Cross St	No 17	Ocean A	south	14	2r3	10	10	10	11	12	13	14	14	14	14	14	14	14
n	Ocean Av	Cross St	Guilfoyle A	east	6	2r3	3	3	3	3	3	3	5	6	6	6	6	6	6
o	Ocean Av	Guilfoyle A	Marathon M	west	11	2r3	5	5	5	5	6	8	10	11	12	13	13	14	14
p	Marathon M	Ocean Av	Spring St	south	4	2r3	0	0	0	0	1	1	3	4	4	5	5	5	5
q	Marathon M	Ocean Av	Spring St	north	5	2r3	3	3	3	3	3	3	3	3	4	5	5	5	5
r	Spring St	Marathon M	end	west		np	0	0	0	0	0	0	0	0	0	1	1	1	1
s	Spring St	Marathon M	end	east		np	0	0	0	0	0	0	0	0	0	0	0	0	0

Curtis Traffic Surveys

Job: 210601mcl (21_0155)

Client: McLaren Traffic Engineering

Day, date 1/06/21

Location: Double Bay

Weather Fine

Surveyor MC

Parking round commencing…

Zone	Street	From	To	Side of Street	Capacity	Restriction	16:00	16:15	16:30	16:45	17:00	17:15	17:30	17:45	18:00	18:15	18:30	18:45	19:00
a	Wiston G	end	Marine P	west	6	u	5	5	4	4	4	4	5	6	6	6	7	7	7
b	Wiston G	end	Marine P	east	10	2r3	6	6	5	5	6	6	6	6	6	8	9	8	8
c	Marine Pd	Wiston G	Ocean A	north	10	10p1	9	8	9	7	8	7	6	5	6	5	4	4	4
d	Marine Pd	Wiston G	Ocean A	south	6	2r3	5	5	5	5	5	5	4	4	4	4	3	2	2
e	Ocean Av	Marine Pd	William S	east	20	10p1	19	18	16	14	13	12	12	10	11	10	9	10	8
f	Ocean Av	Marine Pd	Marathon M	west	16	z7	12	11	10	9	9	8	7	6	5	5	4	2	3
g	William St	Ocean Av	Bay St	north	19	bz2+1car	12	11	11	9	9	9	9	10	10	10	10	9	9
h	Bay St	William St	end	west	15	is	12	11	12	13	11	10	9	8	10	11	13	13	13
I	Bay St	end	William S	east	12	2r3	9	8	8	7	7	7	7	7	8	8	9	8	8
j	William St	Bay St	Ocean A	south	16	4+3*bz5+4*	7	7	7	8	7	6	6	8	7	7	6	7	6
k	Ocean Av	William St	Cross St	east	6	4u+2*2r3	5	4	4	3	3	3	3	3	3	3	3	3	3
l	Cross St	Ocean Av	No 67	north	12	*2r3	4	6	7	7	7	6	7	7	6	6	6	4	4
m	Cross St	No 17	Ocean A	south	14	2r3	12	12	11	10	10	9	10	10	10	9	9	9	10
n	Ocean Av	Cross St	Guilfoyle A	east	6	2r3	5	6	5	3	3	3	3	3	3	3	3	3	3
o	Ocean Av	Guilfoyle A	Marathon M	west	11	2r3	9	7	7	7	8	8	8	8	8	8	8	7	7
p	Marathon M	Ocean Av	Spring St	south	4	2r3	1	2	2	2	2	2	2	2	1	1	0	0	0
q	Marathon M	Ocean Av	Spring St	north	5	2r3	4	4	4	3	3	3	3	2	2	2	1	1	1
r	Spring St	Marathon M	end	west		np	0	0	0	0	0	0	0	0	0	0	0	0	0
s	Spring St	Marathon M	end	east		np	0	0	0	1	0	0	0	0	0	0	0	0	0

Curtis Traffic Surveys

Job: 210601mcl (21_0155)

Client: McLaren Traffic Engineering

Day, date 2/06/21

Location: Double Bay

Weather Fine

Surveyor MC

Parking round commencing…

Zone	Street	From	To	Side of Street	Capacity	Restriction	6:00	6:15	6:30	6:45	7:00	7:15	7:30	7:45	8:00	8:15	8:30	8:45	9:00
a	Wiston G	end	Marine P	west	6	u	7	7	7	7	7	7	7	7	7	5	7	6	7
b	Wiston G	end	Marine P	east	10	2r3	9	9	9	6	7	8	9	9	9	8	7	9	9
c	Marine Pd	Wiston G	Ocean A	north	10	10p1	6	6	7	8	8	9	9	9	9	10	10	10	9
d	Marine Pd	Wiston G	Ocean A	south	6	2r3	2	3	4	5	5	5	5	5	5	4	5	5	5
e	Ocean Av	Marine Pd	William S	east	20	10p1	15	17	19	19	19	19	19	19	20	20	20	20	20
f	Ocean Av	Marine Pd	Marathon M	west	16	z7	6	6	7	7	10	12	14	14	15	14	14	13	13
g	William St	Ocean Av	Bay St	north	19	bz2+1car	12	14	15	15	16	15	16	16	15	15	15	16	15
h	Bay St	William St	end	west	15	is	12	12	13	13	13	13	13	13	13	13	13	13	12
I	Bay St	end	William S	east	12	2r3	7	9	11	12	12	12	12	13	13	14	13	14	13
j	William St	Bay St	Ocean A	south	16	4+3*bz5+4*	3	5	8	8	7	7	7	8	9	10	9	10	7
k	Ocean Av	William St	Cross St	east	6	4u+2*2r3	5	5	5	5	5	6	6	5	5	5	6	6	6
l	Cross St	Ocean Av	No 67	north	12	*2r3	2	2	3	2	3	3	4	4	4	3	6	8	5
m	Cross St	No 17	Ocean A	south	14	2r3	8	9	10	10	11	12	13	14	14	14	14	14	14
n	Ocean Av	Cross St	Guilfoyle A	east	6	2r3	2	2	2	2	3	3	4	5	6	7	7	7	7
o	Ocean Av	Guilfoyle A	Marathon M	west	11	2r3	7	7	7	6	7	7	8	8	9	9	8	8	9
p	Marathon M	Ocean Av	Spring St	south	4	2r3	0	0	1	4	4	4	4	4	4	4	4	4	4
q	Marathon M	Ocean Av	Spring St	north	5	2r3	2	2	2	2	2	3	4	4	4	4	4	4	4
r	Spring St	Marathon M	end	west		np	0	0	0	0	0	0	0	0	0	0	0	0	0
s	Spring St	Marathon M	end	east		np	0	0	0	0	0	0	0	0	0	0	0	0	0

Curtis Traffic Surveys

Job: 210601mcl (21_0155)

Client: McLaren Traffic Engineering

Day, date 2/06/21

Location: Double Bay

Weather Fine

Surveyor MC

Parking round commencing…

Zone	Street	From	To	Side of Street	Capacity	Restriction	16:00	16:15	16:30	16:45	17:00	17:15	17:30	17:45	18:00	18:15	18:30	18:45	19:00
a	Wiston G	end	Marine P	west	6	u	6	6	5	5	4	3	5	5	5	6	5	4	5
b	Wiston G	end	Marine P	east	10	2r3	5	5	6	6	7	5	3	4	4	5	6	7	7
c	Marine Pd	Wiston G	Ocean A	north	10	10p1	10	10	8	7	7	5	6	6	6	7	7	7	7
d	Marine Pd	Wiston G	Ocean A	south	6	2r3	5	5	5	5	5	4	3	3	3	3	2	3	3
e	Ocean Av	Marine Pd	William S	east	20	10p1	16	17	15	12	12	11	11	10	10	10	10	10	10
f	Ocean Av	Marine Pd	Marathon M	west	16	z7	12	11	11	11	9	7	7	6	5	6	6	6	6
g	William St	Ocean Av	Bay St	north	19	bz2+1car	12	12	12	12	11	12	12	12	11	11	10	10	9
h	Bay St	William St	end	west	15	is	13	14	12	11	9	10	9	8	5	6	9	10	10
I	Bay St	end	William S	east	12	2r3	9	10	8	7	7	6	5	5	5	6	8	8	7
j	William St	Bay St	Ocean A	south	16	4+3*bz5+4*	12	12	10	7	7	8	8	8	3	4	4	4	5
k	Ocean Av	William St	Cross St	east	6	4u+2*2r3	4	4	4	3	3	3	2	2	2	2	2	2	2
l	Cross St	Ocean Av	No 67	north	12	*2r3	5	6	5	5	6	7	8	7	8	7	7	6	6
m	Cross St	No 17	Ocean A	south	14	2r3	12	12	11	10	11	11	10	9	9	10	11	11	11
n	Ocean Av	Cross St	Guilfoyle A	east	6	2r3	5	4	5	5	5	5	6	5	3	3	3	3	3
o	Ocean Av	Guilfoyle A	Marathon M	west	11	2r3	11	11	7	6	7	7	7	8	7	7	7	7	7
p	Marathon M	Ocean Av	Spring St	south	4	2r3	2	2	2	1	0	0	0	0	0	0	0	1	1
q	Marathon M	Ocean Av	Spring St	north	5	2r3	2	2	3	4	2	2	2	1	2	2	2	2	1
r	Spring St	Marathon M	end	west		np	0	0	0	0	0	0	0	0	0	0	0	0	0
s	Spring St	Marathon M	end	east		np	0	1	1	1	0	0	0	0	0	0	0	0	0

Curtis Traffic Surveys

Job: 210601mcl (21_0155)

Client: McLaren Traffic Engineering

Day, date 3/06/21

Location: Double Bay

Weather Fine

Surveyor MC

Parking round commencing…

Zone	Street	From	To	Side of Street	Capacity	Restriction	6:00	6:15	6:30	6:45	7:00	7:15	7:30	7:45	8:00	8:15	8:30	8:45	9:00
a	Wiston G	end	Marine P	west	6	u	6	6	6	6	7	7	8	8	8	8	8	8	8
b	Wiston G	end	Marine P	east	10	2r3	6	6	6	8	10	9	9	9	9	9	8	8	8
c	Marine Pd	Wiston G	Ocean A	north	10	10p1	10	10	10	10	10	10	10	9	9	10	10	10	10
d	Marine Pd	Wiston G	Ocean A	south	6	2r3	4	4	4	5	6	6	6	5	5	4	6	6	6
e	Ocean Av	Marine Pd	William S	east	20	10p1	12	15	18	20	20	20	20	20	20	20	20	20	20
f	Ocean Av	Marine Pd	Marathon M	west	16	z7	7	8	9	11	13	14	11	11	13	13	14	14	14
g	William St	Ocean Av	Bay St	north	19	bz2+1car	13	13	13	14	14	15	15	14	14	13	13	12	12
h	Bay St	William St	end	west	15	is	13	13	13	14	14	14	14	14	14	14	14	15	15
I	Bay St	end	William S	east	12	2r3	6	7	11	13	11	11	12	13	13	14	14	14	13
j	William St	Bay St	Ocean A	south	16	4+3*bz5+4*	4	4	6	8	8	9	11	10	8	7	7	7	9
k	Ocean Av	William St	Cross St	east	6	4u+2*2r3	2	3	4	5	5	5	6	6	6	6	6	6	6
l	Cross St	Ocean Av	No 67	north	12	*2r3	3	4	4	5	5	6	8	7	7	7	6	5	7
m	Cross St	No 17	Ocean A	south	14	2r3	11	11	12	12	11	11	14	14	14	13	13	13	13
n	Ocean Av	Cross St	Guilfoyle A	east	6	2r3	3	3	3	3	4	5	4	4	4	5	6	6	6
o	Ocean Av	Guilfoyle A	Marathon M	west	11	2r3	5	5	5	6	6	7	7	8	10	11	12	11	11
p	Marathon M	Ocean Av	Spring St	south	4	2r3	0	0	2	2	3	2	2	3	3	3	4	4	4
q	Marathon M	Ocean Av	Spring St	north	5	2r3	1	1	2	2	2	3	3	3	3	3	3	4	4
r	Spring St	Marathon M	end	west		np	0	0	0	0	0	0	0	0	0	0	0	0	0
s	Spring St	Marathon M	end	east		np	0	0	0	0	0	0	0	0	0	0	0	0	0

Curtis Traffic Surveys

Job: 210601mcl (21_0155)

Client: McLaren Traffic Engineering

Day, date 3/06/21

Location: Double Bay

Weather Rain

Surveyor MC

Parking round commencing…

Zone	Street	From	To	Side of Street	Capacity	Restriction	16:00	16:15	16:30	16:45	17:00	17:15	17:30	17:45	18:00	18:15	18:30	18:45	19:00
a	Wiston G	end	Marine P	west	6	u	4	4	4	4	4	4	4	4	4	4	3	3	3
b	Wiston G	end	Marine P	east	10	2r3	7	7	6	5	3	2	2	2	3	4	4	4	4
c	Marine Pd	Wiston G	Ocean A	north	10	10p1	6	6	7	7	6	7	7	6	5	4	4	4	4
d	Marine Pd	Wiston G	Ocean A	south	6	2r3	4	4	4	4	4	4	3	3	3	4	4	4	4
e	Ocean Av	Marine Pd	William S	east	20	10p1	17	16	14	14	13	12	9	11	10	10	10	10	10
f	Ocean Av	Marine Pd	Marathon M	west	16	z7	9	10	10	10	10	10	10	7	7	6	6	6	6
g	William St	Ocean Av	Bay St	north	19	bz2+1car	9	10	9	9	9	9	8	8	9	9	10	11	11
h	Bay St	William St	end	west	15	is	9	9	8	8	8	9	10	10	11	12	13	13	12
I	Bay St	end	William S	east	12	2r3	11	11	11	11	10	10	10	11	11	11	11	10	10
j	William St	Bay St	Ocean A	south	16	4+3*bz5+4*	7	7	8	8	8	7	6	6	6	5	4	4	4
k	Ocean Av	William St	Cross St	east	6	4u+2*2r3	2	2	2	2	2	2	2	2	2	2	2	2	2
l	Cross St	Ocean Av	No 67	north	12	*2r3	3	3	2	2	3	3	3	3	3	3	4	4	3
m	Cross St	No 17	Ocean A	south	14	2r3	12	12	12	11	11	11	9	9	9	9	9	9	10
n	Ocean Av	Cross St	Guilfoyle A	east	6	2r3	6	4	5	5	5	5	5	5	6	6	5	5	5
o	Ocean Av	Guilfoyle A	Marathon M	west	11	2r3	11	11	9	9	8	6	7	5	5	6	6	5	5
p	Marathon M	Ocean Av	Spring St	south	4	2r3	1	1	2	1	1	1	1	1	1	1	1	1	1
q	Marathon M	Ocean Av	Spring St	north	5	2r3	1	1	1	1	1	1	1	1	1	1	1	1	1
r	Spring St	Marathon M	end	west		np	0	0	0	0	0	0	0	0	0	0	0	0	0
s	Spring St	Marathon M	end	east		np	0	0	0	0	0	0	0	0	0	0	0	0	0

ANNEXURE C: PUBLIC TRANSPORT LEVEL OF SERVICE
(1 SHEET)

3.1 Public Transportation Level of Service

The Transport Research Board's *Transit Capacity and Quality of Service Manual 2003* outlines a means of determining the Level of Service of bus routes. Based on an assessment of bus frequency, hours, and coverage and indicative Level of Service can be determined. Although no formal way of determining level of service for ferries, it is reasonable to assume that these standards apply to ferries as well as buses.

The Level of Service is determined using the frequency and hours according to the criteria given in **Table C1** and **Table C2** respectively. Level "C" or above is considered acceptable and attractive to users.

TABLE C1: LOS CRITERIA – PUBLIC TRANSPORT SERVICE FREQUENCY

Level of Service (LoS)	Minutes per Service	Services per hour	Comments
A	<10	>6	Passengers do not need schedules
B	10-14	5-6	Frequent service, passengers consult schedules
C	15-20	3-4	Maximum desirable wait time to wait if bus missed
D	21-30	2	Service unattractive to choice riders
E	31-60	1	Service available during the hour
F	>60	<1	Service unattractive to all riders

TABLE C2: LOS CRITERIA – SERVICE HOURS

Level of Service (LoS)	Hours of Service	Comments
A	19-24	Passengers do not need schedules
B	17-18	Frequent service, passengers consult schedules
C	14-16	Maximum desirable wait time to wait if bus missed
D	12-13	Service unattractive to choice riders
E	4-11	Service available during the hour
F	0-3	Service unattractive to all riders

The Level of Service of each bus route within 400m walking distance of the site and close proximity to the train station is shown in **Table A3** below.

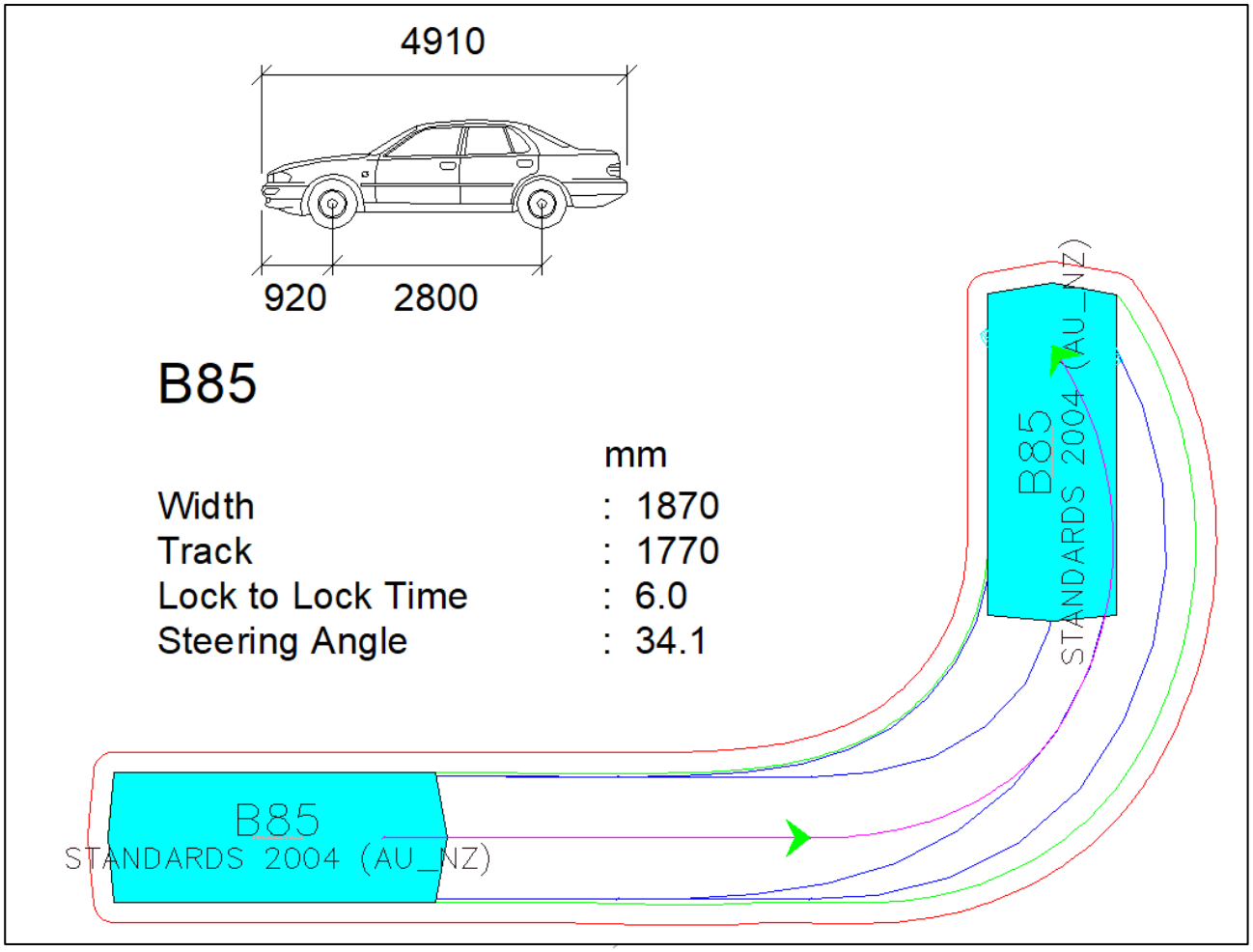
TABLE C3: LEVEL OF SERVICE OF SURROUNDING PUBLIC TRANSPORT ROUTES

Route	AM Peak(1)		Interpeak		PM Peak(1)		Overall Service Hours	LoS
	Frequency	LoS	Frequency	LoS	Frequency	LoS		
328	2 per hour	D	1 per hour	E	2 per hour	D	18	B
F7 Ferry	2 per hour	D	1 per hour	E	2 per hour	D	14	C

Notes:

(1) AM Commuter Peak assumed as 7:30AM – 8:30AM, PM as 5:00PM – 6:00PM, inter-peak 12pm-1pm.

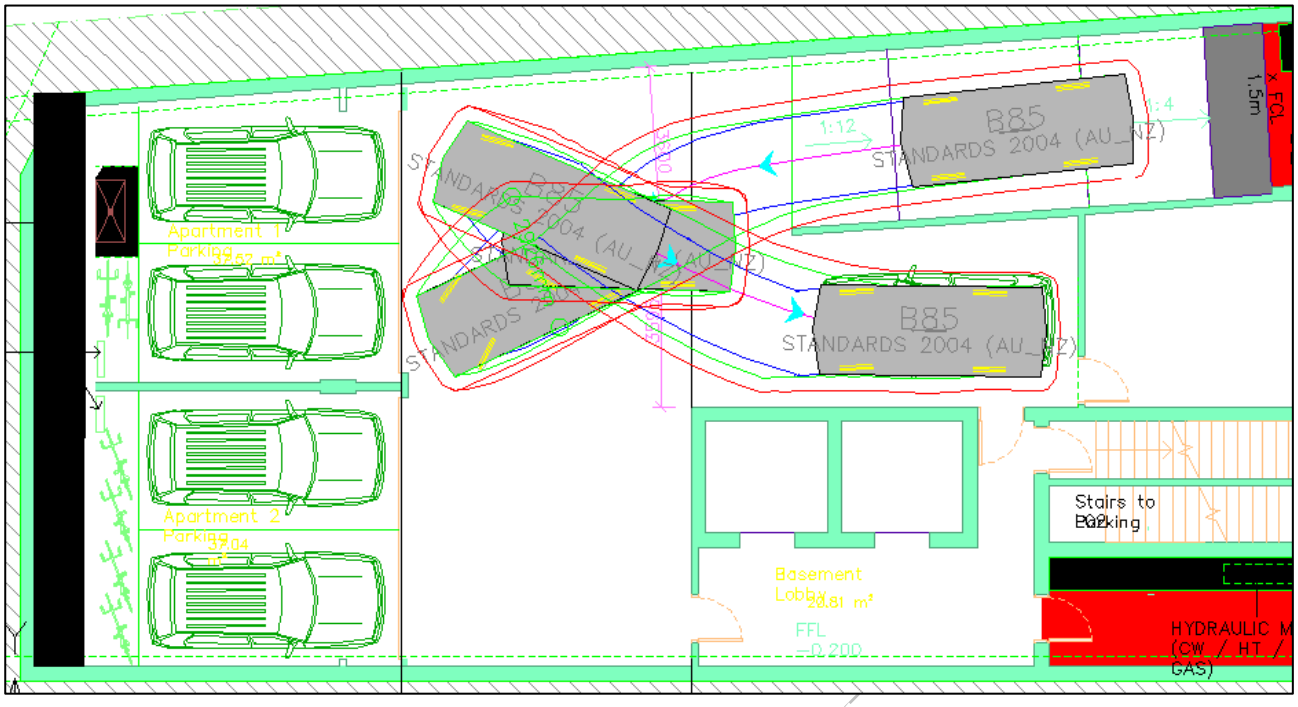
ANNEXURE D: SWEPT PATH ANALYSIS
(5 SHEETS)



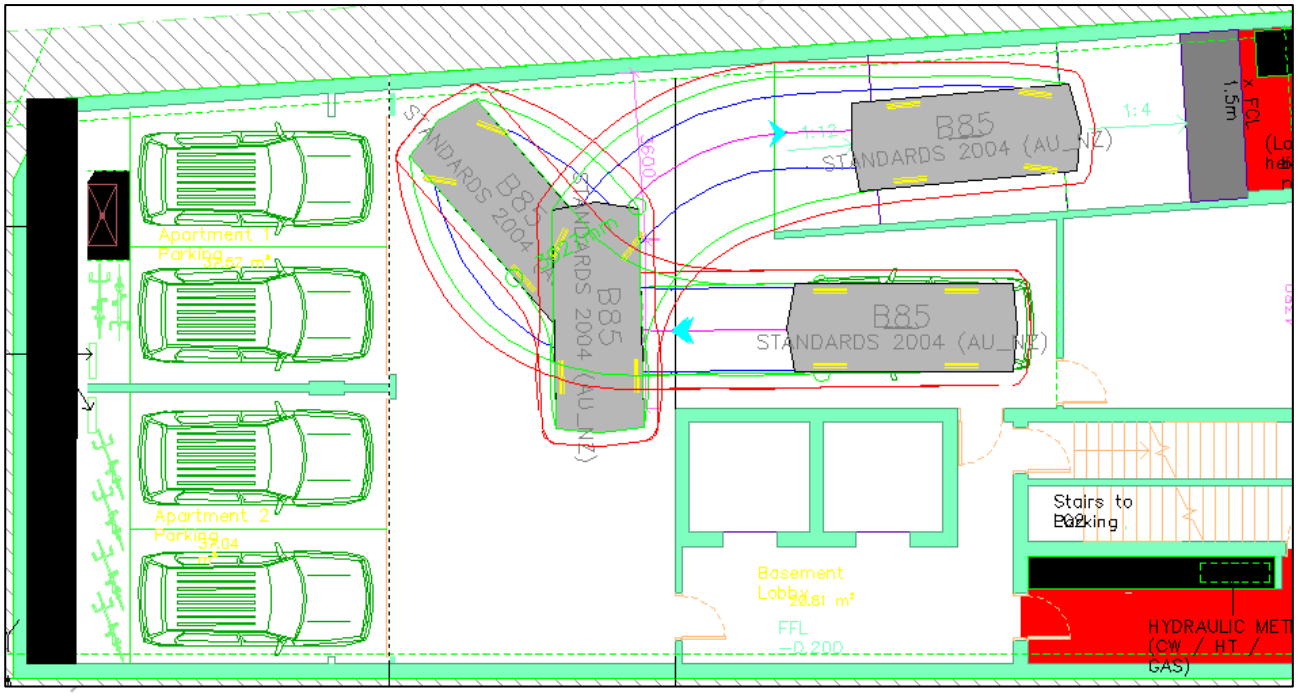
AUSTRALIAN STANDARD 85TH PERCENTILE SIZE VEHICLE (B85)

Blue – Tyre Path
Green – Vehicle Body
Red – 300mm Clearance

SECTION 2.1 SWEPT PATHS



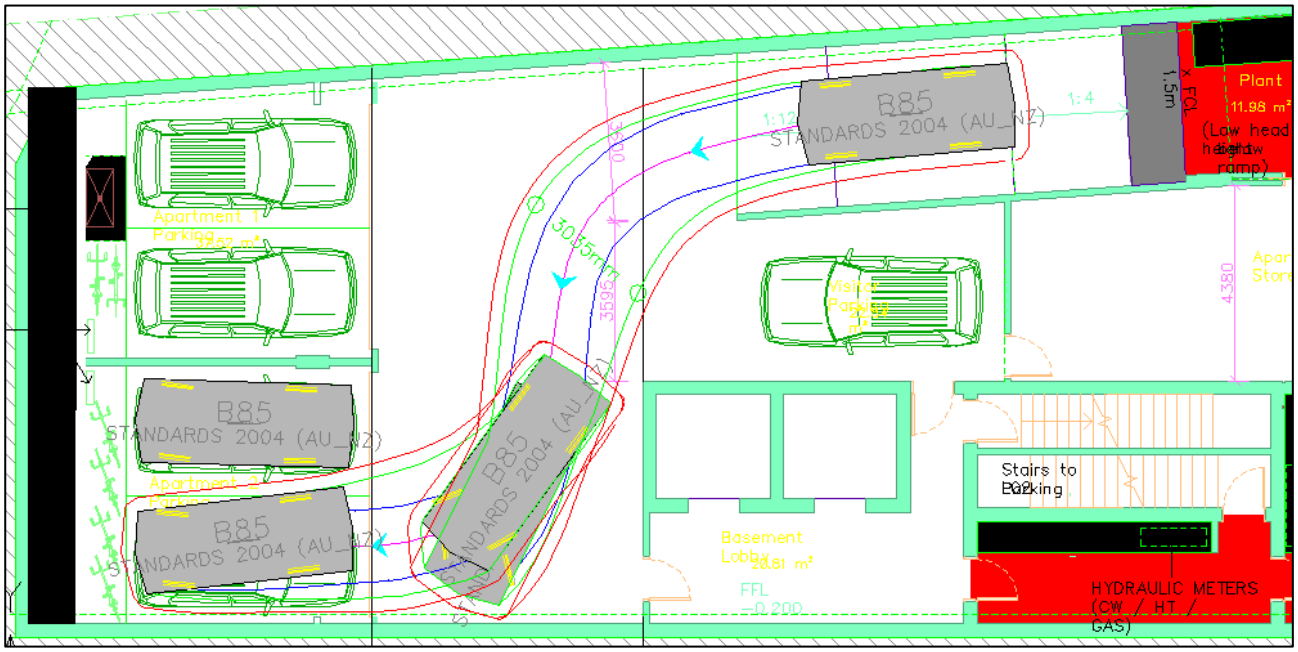
ENTRY INTO SPACE – 4 MANOEUVRES



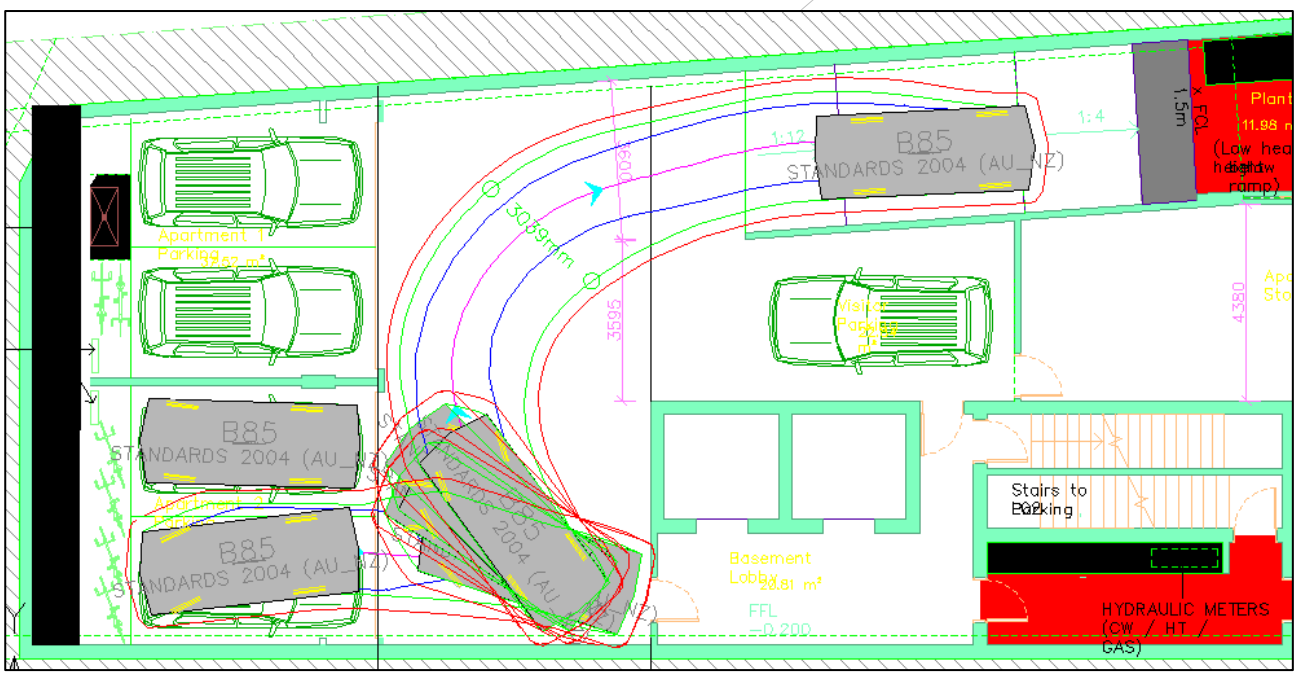
EXIT FROM SPACE – 3 MANOEUVRES

UNSUCCESSFUL – TOTAL OF 7 MANOEUVRES

SECTION 2.1 SWEPT PATHS



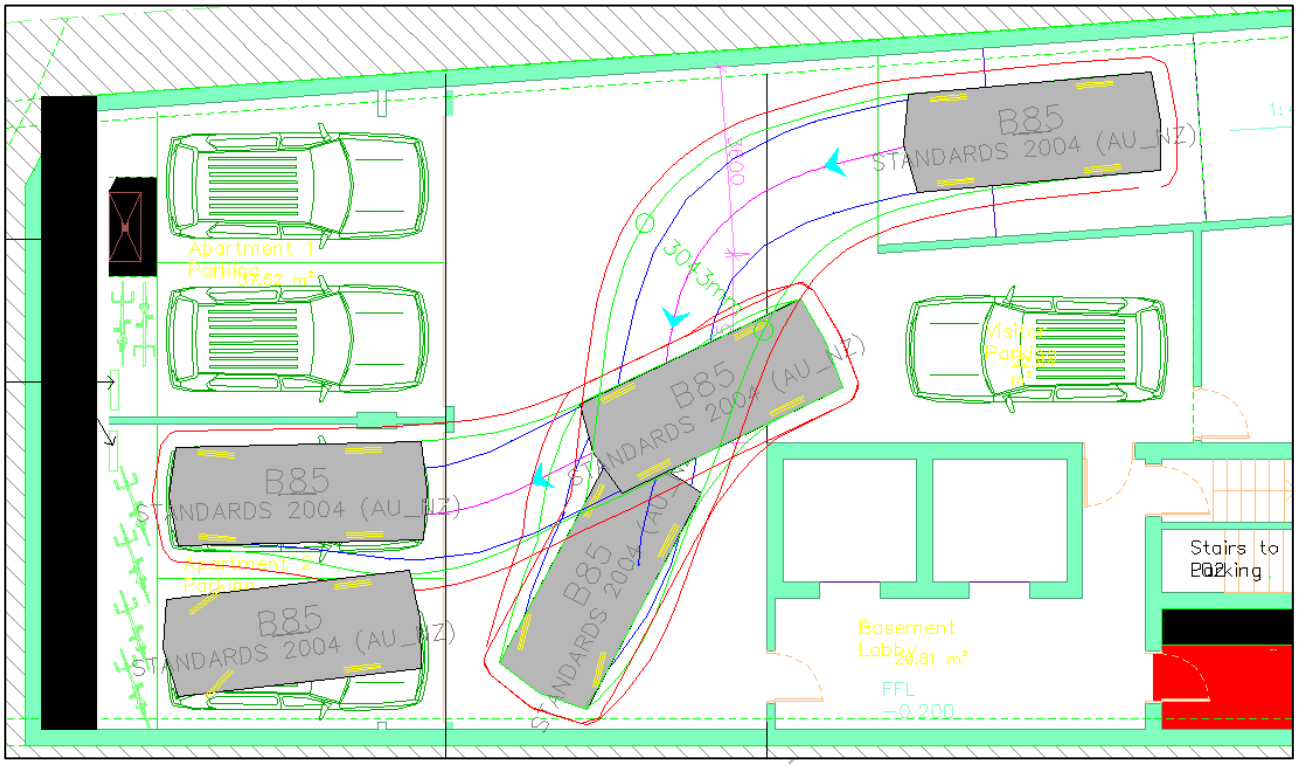
ENTRY INTO SPACE – 3 MANOEUVRES



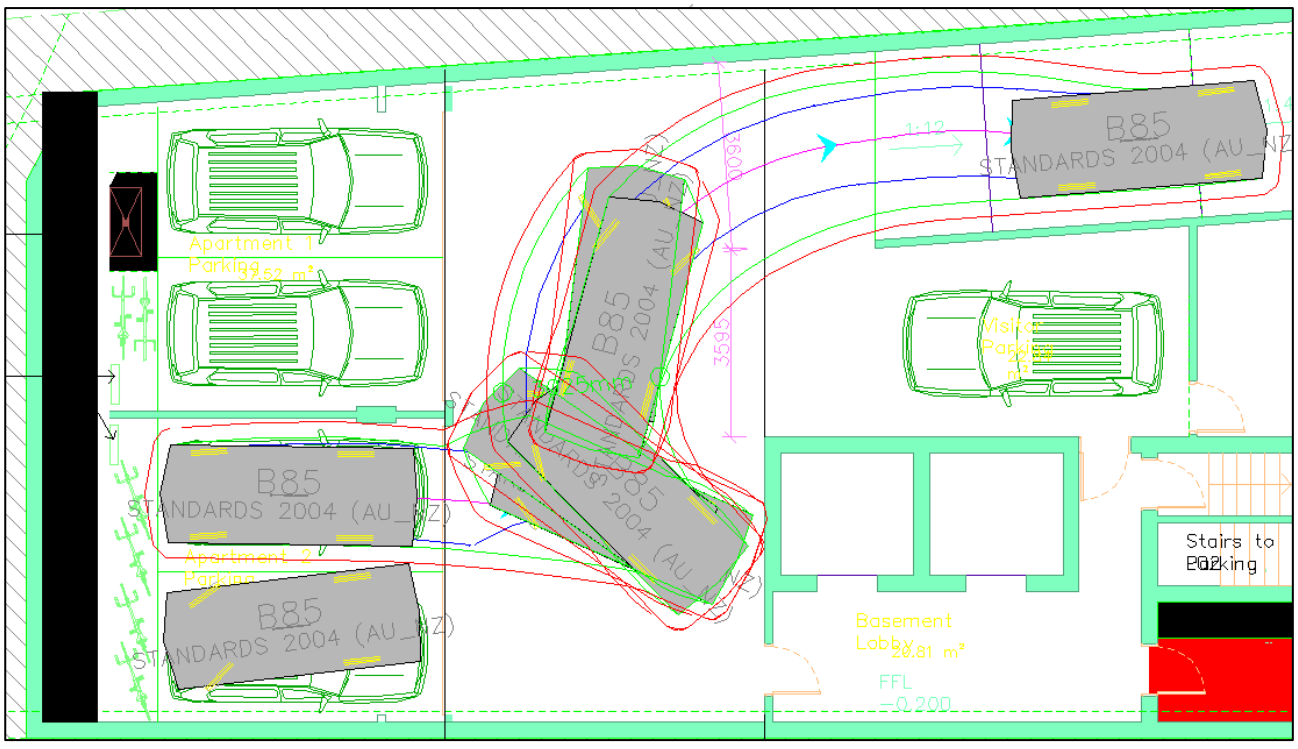
EXIT FROM SPACE – 6 MANOEUVRES

UNSUCCESSFUL – TOTAL OF 9 MANOEUVRES

SECTION 2.1 SWEPT PATHS



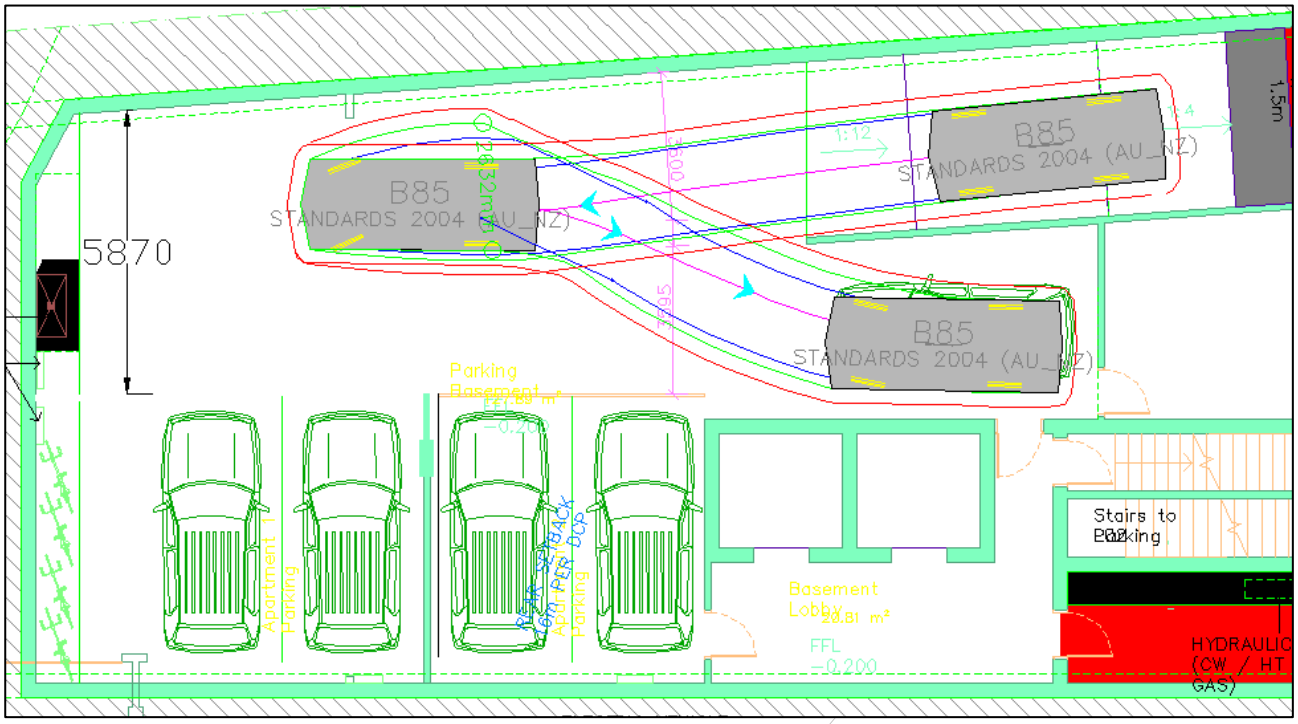
ENTRY INTO SPACE – 3 MANOEUVRES



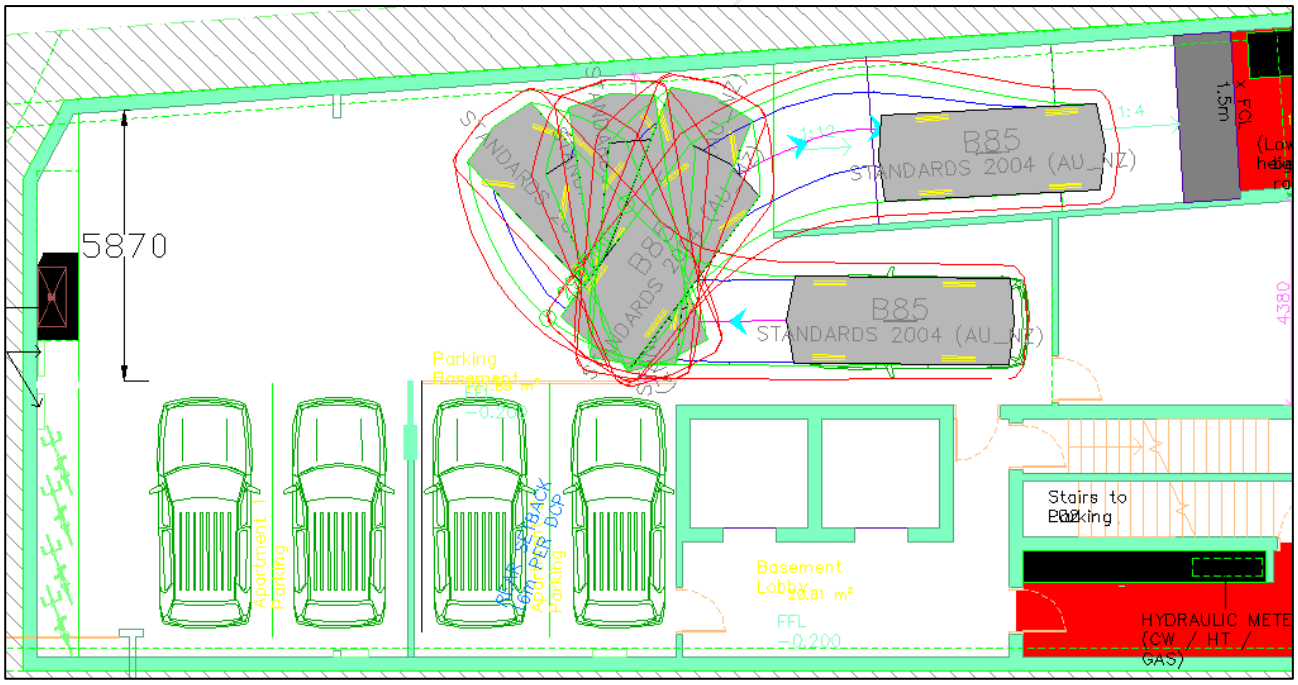
EXIT FROM SPACE – 6 MANOEUVRES

UNSUCCESSFUL – TOTAL OF 9 MANOEUVRES, COLLIDES WITH OTHER CAR IN GARAGE

SECTION 2.2 SWEPT PATHS



ENTRY INTO VISITOR SPACE – 2 MANOEUVRES



EXIT FROM VISITOR SPACE – 7 MANOEUVRES

UNSUCCESSFUL – TOTAL OF 9 MANOEUVRES