S4.55 TRAFFIC AND PARKING IMPACT ASSESSMENT OF PROPOSED MIXED USE DEVELOPMENT AT 1102 BARRENJOEY ROAD, PALM BEACH

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

200720.01FB - 15 April 2021

Development Type: **Proposed Mixed Use Development**

Site Address: **1102 Barrenjoey Road, Palm Beach**

Prepared for: **Reform Projects**

Document reference: **200720.01FB**

Status	Issue	Prepared By	Checked By	Date
Draft	A	ME	MM	8 December 2020
Draft	B	ME		12 April 2021
Final	A	ME	MM	12 April 2021
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TABLE OF CONTENTS

1 INTRODUCTION

M^CLaren Traffic Engineering was commissioned by *Reform Projects* to provide a S4.55 Traffic and Parking Impact Assessment of the Proposed Mixed Use Development at 1102 Barrenjoey Road, Palm Beach as depicted in **Annexure A**.

1.1 Description and Scale of Development

The existing, approved and proposed development has the following characteristics relevant to traffic and parking:

- Existing Development:
  - Restaurant premises (fish and chip shop) of 270m^2 gross floor area (GFA), containing 72 seats;
  - Ability for two (2) vehicles to be parked informally within an at-grade gravel car parking area, with vehicular access from Barrenjoey Road.
- Approved Development (Consent No: N0119/14 from Pittwater Council):
  - Three (3) restaurant premises (refreshment rooms) of 323.8m^2 GFA, containing 168 seats located on the ground floor;
  - Four (4) residential apartments containing 3 or more bedrooms located on level 1 and level 2;
  - A basement car parking level with vehicular access via a two-way ramp from Barrenjoey Road containing 21 car parking spaces as per the following:
    - 11 retail spaces, including one (1) disabled car parking space;
    - Eight (8) residential spaces;
    - Two (2) residential visitor spaces.
- Proposed Development:
  - Two (2) retail premises of 409m^2 GFA located on the ground floor;
  - Six (6) residential apartments containing 3 or more bedrooms located on level 1 and level 2;
  - A basement car parking level with vehicular access via a two-way ramp at street level, tapering down to a single width ramp thereafter, from Barrenjoey Road and containing 23 car parking spaces as per the following:
    - Seven (7) retail spaces;
    - 14 residential spaces including one (1) disabled car parking space;
    - Two (2) residential visitor spaces.

1.2 State Environmental Planning Policy (Infrastructure) 2007

The proposed development is not of relevant size and capacity under *Clause 104* of the *SEPP (Infrastructure) 2007* to be referred to the Transport for New South Wales (TfNSW) as the scale of the food and drink premises does not increase by more than 300m^2 gross floor area. As such, it is expected that the proposal can be assessed by Northern Beaches Council officers accordingly.

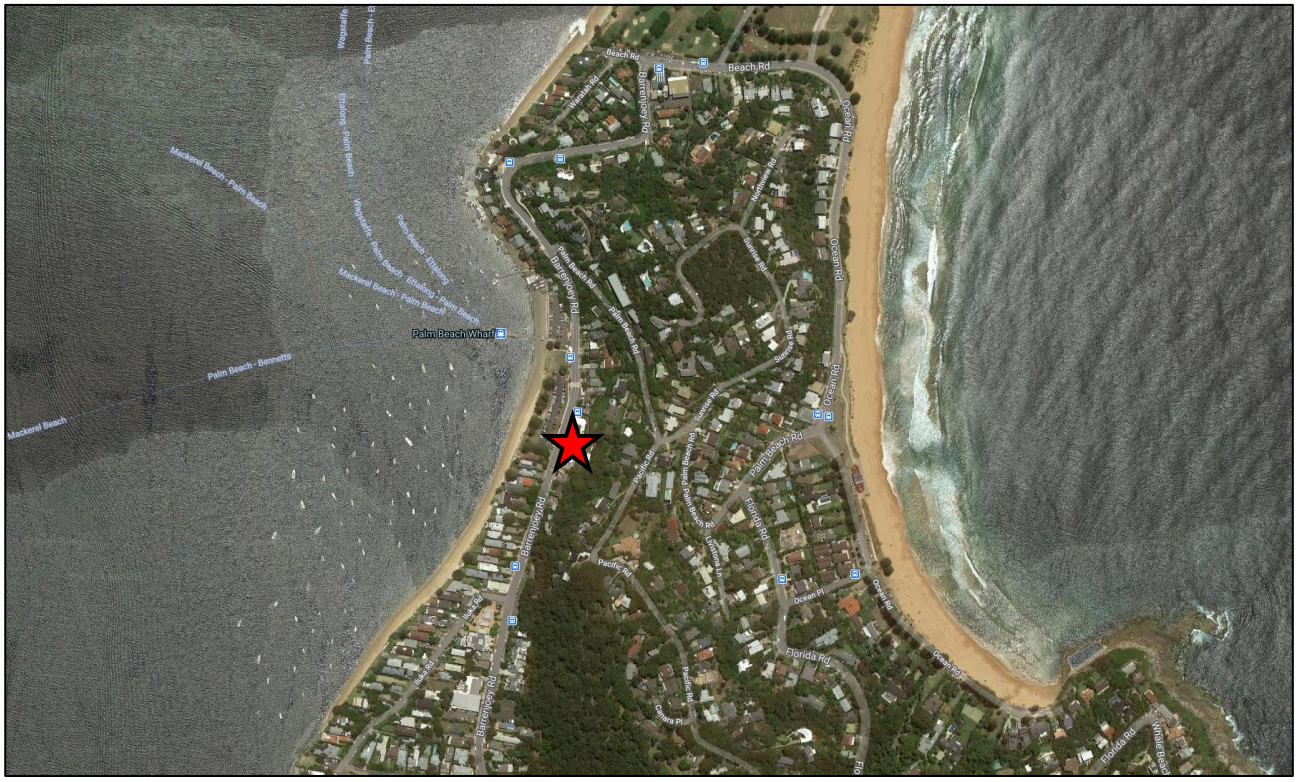
1.3 Site Description

The subject development involves the demolition of existing structures and construction of a new three-storey building. The subject site is currently zoned *B1 – Neighbourhood Centre* under the *Pittwater Local Environmental Plan 2014* as adopted by Northern Beaches Council. The site has a single road frontage to Barrenjoey Road to the west

The site is generally surrounded by low to medium density residential developments to the north, south and east, with Pittwater Bay to the west. Barrenjoey House Palm Beach (restaurant) shares the northern boundary of the site, with Pittwater Park and associated car park area located directly to the west. The Palm Beach Wharf is located approximately 160m to the north-east from the subject site and Pittwater Beach approximately 400m to the east.

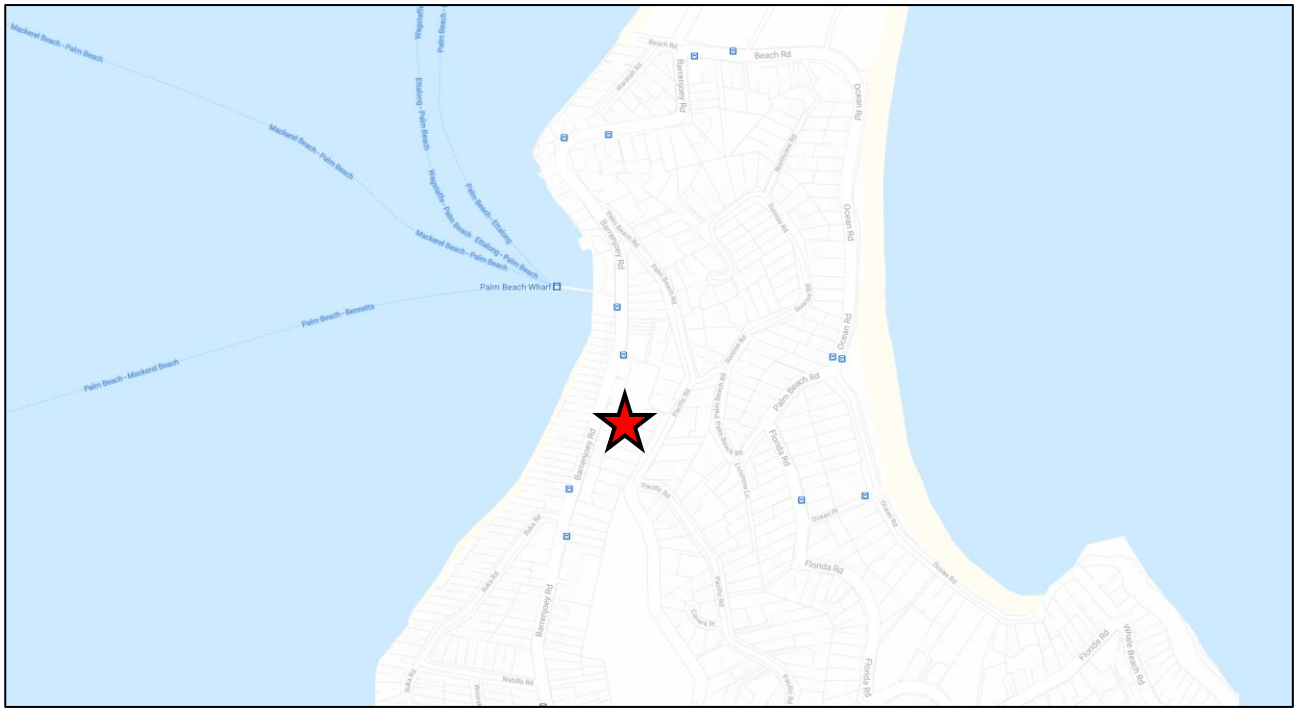
1.4 Site Context

The location of the site is shown on an aerial photo and a street map in **Figure 1** and **Figure 2** respectively.



Site Location

FIGURE 1: SITE CONTEXT – AERIAL PHOTO



Site Location

FIGURE 2: SITE CONTEXT – STREET MAP

2 EXISTING TRAFFIC AND PARKING CONDITIONS

2.1 Road Hierarchy

The road network servicing the site has characteristics as described in the following sub-sections.

2.1.1 Barrenjoey Road

- RMS (TfNSW) Classified STATE ARTERIAL Road (No. 164);
- Approximately 13m wide two-way carriageway within near vicinity of the site facilitating one (1) traffic lane in each direction and a line marked kerbside parking lane on both sides of the road;
- Signposted 40km/h (high pedestrian activity) adjacent to the site and to the north;
- Signposted 50km/h speed limit to the south of the site;
- Signposted "*1-Hour Parking, 8:30am – 8:00pm Everyday*" on both sides of the road with line marked kerbside parking lanes.

2.2 Existing Traffic Management

- Elevated wombat pedestrian crossing across Barrenjoey Road approximately 100m to the north of the site;
- Access driveway to the Pittwater Park Carpark (south) on the western side of Barrenjoey Road, located approximately 110m to the north of the subject site;
- Egress driveway to the Pittwater Park Carpark (south) on the western side of Barrenjoey Road, located directly across from the subject site;
- Priority controlled intersection of Barrenjoey Road / Palm Beach Wharf access road.

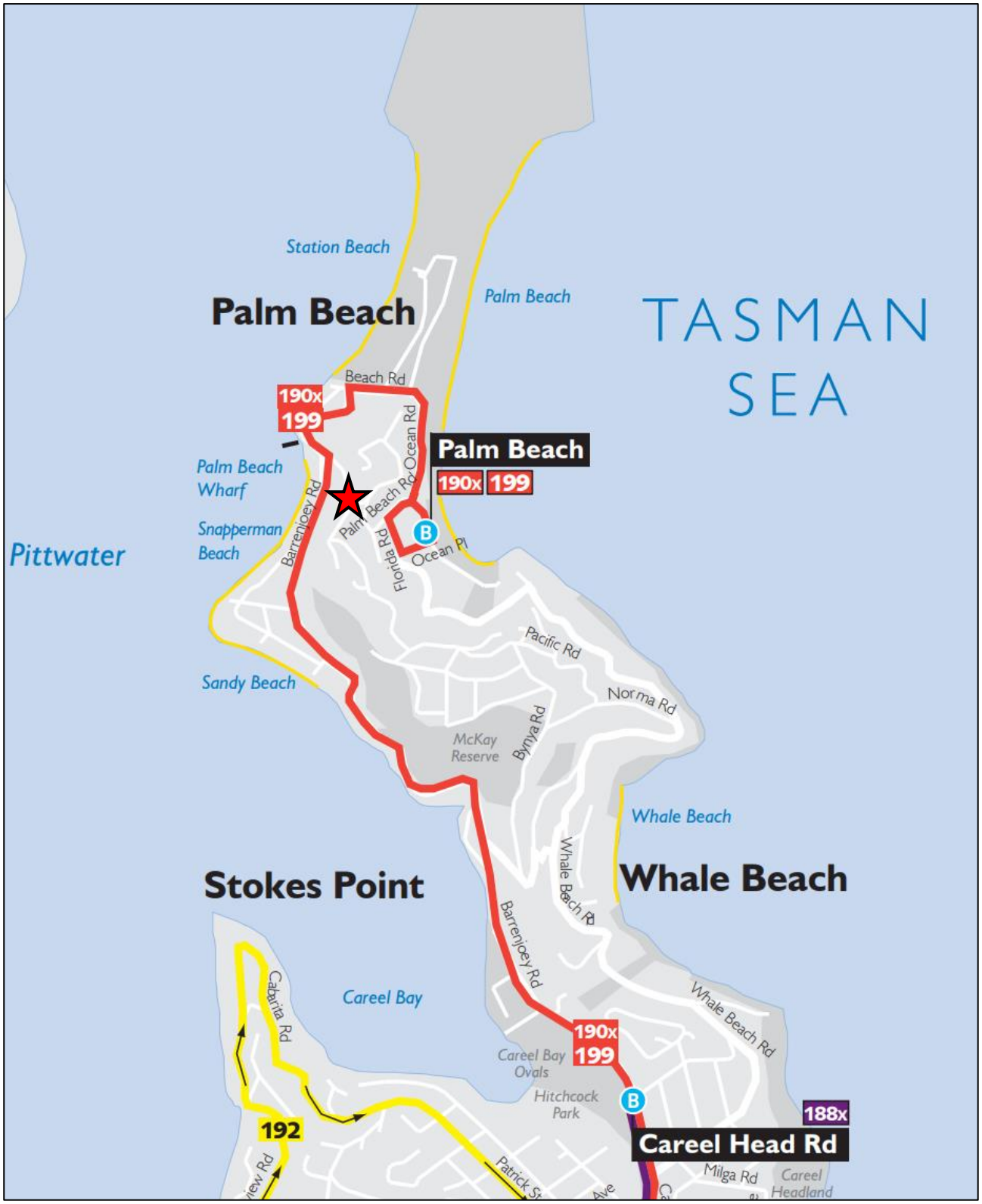
2.3 Public Transport

The subject site has access to existing bus stop (ID: 210829) located approximately 60m walking distance to the north of site on Barrenjoey Road. The bus stop services existing bus routes 190X (Palm Beach to City Wynyard (Express Service)) and 199 (Palm Beach to Manly) provided by State Transit.

The subject site has access to the Palm Beach Wharf (ID: 208028) located approximately 230m to the north of the subject site with access from Barrenjoey Road. The wharf services existing ferry routes PlmB (Palm Beach to Coasters Retreat Ferry) and WagE (Palm Beach, Wagstaffe, Ettalong Ferry) provided by Palm Beach Ferry Service (private service).

There is no train station within an accessible distance from the subject site.

The location of the site subject to the surrounding public transport network is shown in **Figure 3** (overleaf).



Site Location

FIGURE 3: PUBLIC TRANSPORT NETWORK MAP

2.4 Future Road and Infrastructure Upgrades

From Northern Beaches Council Development Application tracker and website, it appears that there are no future planned road or public transport changes that will affect traffic conditions within the immediate vicinity of the subject site.

3 PARKING ASSESSMENT

3.1 Council DCP Parking Requirements

Reference is made to the *Pittwater 21 Development Control Plan* as adopted by the Northern Beaches Council which designates the following parking rates applicable to the proposed development:

> ***B6.3 Off-Street Vehicle Parking Requirements***
>
> ***TABLE 1: Onsite Car Parking requirements***
>
> *Multi Dwelling Housing, Residential Flat Buildings and Shop-Top Housing:*
>
> *2 or more bedroom dwellings*
>
> *2 spaces per dwelling*
>
> *Adaptable Housing in accordance with control C1.9 of the Pittwater 21 Development Control Plan.*
>
> *1 space per dwelling in accordance with AS 4299-1995: Adaptable Housing.*
>
> *Separate visitor parking is to be provided at a rate of 1 space per 3 dwellings rounded up.*
>
> *Retail Premises*
>
> *1 per 30m² GLA*
>
> *Provision of accessible parking spaces for people with disabilities must be at the rate of 3% of the required car parking spaces or part thereof, or 1 space, whichever is greater.*
>
> *Restaurants and Cafes*
>
> *1 per 30m² GLA*
>
> *Provision of accessible parking spaces for people with disabilities must be at the rate of 3% of the required car parking spaces or part thereof, or 1 space, whichever is greater.*

Table 1 presents the parking requirements of the proposal according to the Council's above car parking rates. It is noted that for the restaurant / café premises, GFA is taken to equal GLA.

TABLE 1: DCP PARKING RATES

Land Use	Type	Scale	Rate	Parking Required	Parking Provided
Shop-top Housing	2 or more bedrooms	6 dwellings	2 per dwelling	12	14
	Visitor	6 dwellings	1 per 3 dwellings	2	2
Retail	-	409m^2 GFA	1 per 30m^2 GLA	14 (13.6)	7
TOTAL	**-**	**-**	**-**	**28**	**23**

As shown above, strict application of the DCP requires the provision **28** car parking spaces, with 12 for residential use, two (2) for residential visitor use and 14 for retail use. The proposed plans detail the provision of **23** car parking spaces, 14 for residential use, two (2) for residential visitor use and seven (7) for retail use. This results in a net shortfall of five (5) spaces from Council's DCP requirements, comprising of a surplus of two (2) residential spaces and a shortfall of seven (7) retail spaces.

3.1.1 Car Parking Shortfall

The existing use of the site consists of a fish and chip shop premises of 270m^2 GFA and has two (2) associated on-site car parking spaces. With application of Council's DCP car parking rates applicable to restaurants, the existing development requires the provision of nine (9) car parking spaces. With this, it is evident that the there is an existing car parking shortfall of seven (7) spaces associated with the subject site.

This car parking shortfall is evidently accounted for by the on-street car parking available within close proximity to the site. This is typical of local shops near water fronts and public parks, with the key attractor to the area being the beach, public park and ferry facilities with the use of shop premises being ancillary to the area.

In any case, under the proposed conditions it is not recommended that visitors associated with the retail uses are to access the proposed basement car parking area, to limit traffic flow across the footpath area. As Council's DCP does not specify a visitor car parking rate for retail uses, it is assumed that 50% of the retail requirement is associated with visitors, being seven (7) car parking spaces. Seven (7) vehicles parking off-site is equivalent to the existing car parking shortfall associated with the subject site. As such, no change to the on-street car parking conditions will be noticed under the future car parking conditions and as such, the proposed car parking shortfall is acceptable.

3.2 Disabled Parking

Reference is made to Council's DCP which requires one (1) adaptable car parking space per adaptable dwelling. Further, reference is made to the *Building Code of Australia* (BCA) as part of the *National Construction Code 2019 (NCC)*, which categorises retail premises as a Class 6 building. *Table D3.5* of the BCA specifies that a Class 6 building requires disabled car parking at a rate of "*1 space per 50 car parking spaces or part thereof*".

The site therefore requires one (1) adaptable space in association with the adaptable dwelling and one (1) disabled space for retail use. The proposed car parking area has the ability to provide two (**2**) disabled car parking spaces with at least one (**1**) to be associated with the adaptable dwelling. It is noted that retail visitors are expected to park on-street and as such will utilise existing publicly available facilities.

3.3 Bicycle and Motorcycle Parking Requirements

Council's DCP states the following with regarding to the provision of bicycle parking facilities applicable to the proposed uses:

> ***Bicycle Storage***
>
> *For residential development (other than a dwelling house, dual occupancy, secondary dwellings, exhibition homes and rural workers' dwellings), secure bicycle storage facilities must be provided within the building at the rate of 1 bicycle rack per 3 dwellings.*

As such, the proposed development requires two (2) bicycle racks for residential users. Each residential dwelling is provided with a storage area which can be utilised as bicycle parking if required. As such, the proposed bicycle parking provision satisfies Council requirements.

Council's DCP does not provide a motorcycle parking rate for the proposed uses and as such does not require this facility.

3.4 Servicing & Loading

The *Pittwater 21 Development Control Plan* as adopted by the Northern Beaches Council does not provide servicing and loading rates applicable to the proposed development. It is expected that servicing and loading for the restaurant / café premises can be conducted on-street within the signposted loading zone near the northern boundary of the site on the Barrenjoey Road frontage as per existing operations.

Waste collection for all components of the development can be completed from the street frontage on Barrenjoey Road by Council's waste collection service or a private waste contractor as per existing conditions.

3.5 Car Park Design & Compliance

The car parking layout as depicted in **Annexure A,** have been assessed to achieve the relevant clauses and objectives of *AS2890.1:2004* and *AS2890.6:2009*. Any variances from standards are addressed in the following subsections including required changes, if any. Swept path testing has been undertaken and are reproduced within **Annexure B** for reference.

The proposed car park design achieves:

- 5.5m width between kerbs, facilitating two-way passing from Barrenjoey Road:
    - 0.3m width kerbs are provided along both sides of the driveway, providing 6.1m width between walls.
- Ramp narrows to 3.6m in width facilitating one-way access to the basement car parking level:
    - The one-way system is to be under signal control.
- Compliant ramp grades can be accommodated within the driveway design, with a compliant ramp gradient design shown in **Annexure B**;
- Minimum 6.0m width parking aisles;
- Minimum 5.4m length, 2.4m width spaces for residents and staff;
- Minimum 5.4m length, 2.6m width spaces for visitors;
- Minimum 5.4m length, 2.4m width disabled spaces with adjacent associated 5.4m length, 2.4m width shared space;
- Minimum headroom of 2.2m for general circulation and 2.5m headroom clearance provided over disabled and adaptable parking areas.

Whilst the plans have been assessed to comply with the relevant standards, it is usual and expected that a design certificate be required at the Construction Certificate stage to account for any design changes following the development application.

Pedestrian sight triangles as per *Figure 3.3* of *AS2890.1:2004* are to be clear of any high objects to ensure adequate visibility between vehicles leaving the car park driveway and pedestrians on the frontage footpath.

Ramp signals are required to ensure safe access and egress arrangements are conducted along the one-way length of ramp. Signals are to prioritise vehicles entering the site to ensure no queues protrude onto the street and over the footpath. A line-marked waiting bay is to be positioned on the entry ramp within the property boundary such that two-way passing is achieved when a vehicle leaves the basement. Further, ramp signal design and functionality requirements are to be conducted by an appropriately certified ramp signal designer, such as *AGD Systems*.

4 TRAFFIC ASSESSMENT

The impact of the expected traffic generation levels associated with the subject proposal is discussed in the following sub-sections.

4.1 Traffic Generation and Impact

Traffic generation rates for the relevant land uses are provided in the *Roads and Maritime Services (RMS) Guide to Traffic Generating Developments (2002)* and recent supplements and are as follows:

RMS Guide

3.3.2 Medium density residential flat building.

Larger units and town houses (three or more bedrooms):

Weekday peak hour vehicle trips = 0.5-0.65 per dwelling

3.6 Retail

V(P) = 56 A (SS) per 1000m^2 GLFA

Where A(SS): Specialty shops

3.7.2 Restaurants.

Evening peak hour vehicle trips = 5 per 100 m2 gross floor area

Applying these site-specific traffic generation rates to the scale of the proposed results in the estimated traffic generation as summarised in **Table 2**, with the traffic generation of the existing and approved development presented for comparison. It is noted that for conservative assessment, the approved restaurant / café premises have been assumed to be open for morning trade and as such the restaurant evening rate has been applied to the AM peak hour period. Further, the existing development is closed prior to 11:30am and as such, no morning traffic is associated with the existing development.

TABLE 2: ESTIMATED PEAK HOUR TRAFFIC GENERATION

Use	Scale	Generation Rate	Trips	Peak Hour Split (1)(2)	
				AM	PM
EXISTING USE					
Restaurant	270m^2 GFA	5 per 100m^2	14	0 (3)	7 in, 7 out
APPROVED USE					
Restaurant	324m^2 GFA	5 per 100m^2	16	8 in, 8 out	8 in, 8 out
Residential	4 units	0.65 per unit	3	1 in, 2 out	2 in, 1 out
APPROVED TOTAL	**-**	**-**	**19**	**9 in, 10 out**	**10 in, 9 out**
PROPOSED USE					
Retail	409m^2 GFA	5.6 per 100m^2	23	12 in, 11 out	11 in, 12 out
Residential	6 units	0.65 per unit	4	1 in, 3 out	3 in, 1 out
PROPOSED TOTAL	**-**	**-**	**27**	**13 in, 14 out**	**14 in, 13 out**
NET CHANGE FROM EXISTING	**-**	**-**	**-**	**+13 in, +14 out**	**+7 in, +6 out**
NET CHANGE FROM APPROVED	**-**	**-**	**-**	**+4 in, +4 out**	**+4 in, +4 out**

Notes: (1) Restaurant and retail trip generation assumed to be 50% in, 50% out for all peak periods.
(2) Residential trip generation assumed to be 20% in, 80% out during the AM peak hour period and 80% in, 20% out during the PM peak hour period.
(3) Existing development is closed during the morning period and as such, no traffic generation associated.

As shown, the traffic generation associated with the proposed development is in the order of **27** vehicle trips in both the AM peak hour period (13 in, 14 out) and PM peak hour period (14 in, 13 out). When compared to the existing development, the net change in traffic generation due to the proposed development is in the order of **+27** trips (+13 in, +14 out) in the AM peak hour period and **+13** trips (+7 in, +6 out) in the PM peak hour period. When compared to the approved development, there is a slight increase to traffic generation in the order of **+8** trips in the AM (+4 in, +4 out) and PM (+4 in, +4 out) peak hour periods.

Council has approved the level of traffic associated with the approved development as part of the previous submission and with such a minimal increase in associated traffic generation under the proposed conditions of eight (8) vehicle trips in an hour (one trip every 7.5-minutes), it is not expected there will be any adverse impacts on any nearby intersections with the traffic generation expected to be readily accommodated within the existing road network with minimal impact in terms of traffic flow efficiency and road safety considerations.

To ensure the proposed site driveway operates safety, the subject basement car park will be restricted to retail staff car parking and residential uses only (visitor and residential parking). As such the likely traffic generation at the site driveway is expected to be **11** vehicle trips in the AM and PM peak hour periods. This is comprised of four (4) vehicle trips

associated with residential users and seven (7) vehicle trips associated with retail users, based on one (1) trip per retail car parking space. This results in **16** vehicle trips occurring within the surrounding areas, likely the public car parks, consistent with existing operations.

Based upon the above, a queuing assessment has been undertaken to ensure the 98th percentile queue does not exceed one (**1**) storage space to ensure vehicles will not queue across the pedestrian footpath and verge.

The detailed queuing assessment is provided in **Annexure C** for reference, undertaken in accordance with AUSTROADS requirements. Based upon the queuing assessment the 98th percentile queue is not expected to exceed a storage of one (1) vehicle and as such the operation of the site driveway is acceptable.

5 CONCLUSION

In view of the foregoing, the subject Proposed Mixed Use Development proposal at 1102 Barrenjoey Road, Palm Beach (as depicted in **Annexure A**) is fully supportable in terms of its traffic and parking impacts. The following outcomes of this traffic impact assessment are relevant to note:

- The proposal includes the provision of 23 car parking spaces, resulting in a net shortfall of five (5) car parking spaces from Council's DCP requirements, comprising of a surplus of two (2) residential spaces and a shortfall of seven (7) retail spaces, with all retail visitors expected to park on-street.

- Based upon the existing shortfall of seven (7) car parking spaces associated with the existing use of the site, it is expected that the on-street car parking provision can adequately accommodate the seven (7) visitor vehicles without any noticeable change to car parking conditions. The operation of the on-site car parking will be restricted to residential and staff use only to limit vehicle flow across the public footpath. To enforce this, the driveway is to be signposted accordingly.

- Council's DCP requires the provision of two (2) bicycle parking racks for residents which can be accommodated within the provided residential storage within the basement. Council's DCP does not require the provision of motorcycle parking facilities.

- The parking areas of the site have been assessed against the relevant sections of *AS2890.1:2004* and *AS2890.6:2009* and have been found to satisfy the objectives of each standard. Swept path testing has been undertaken and is reproduced within **Annexure B**.

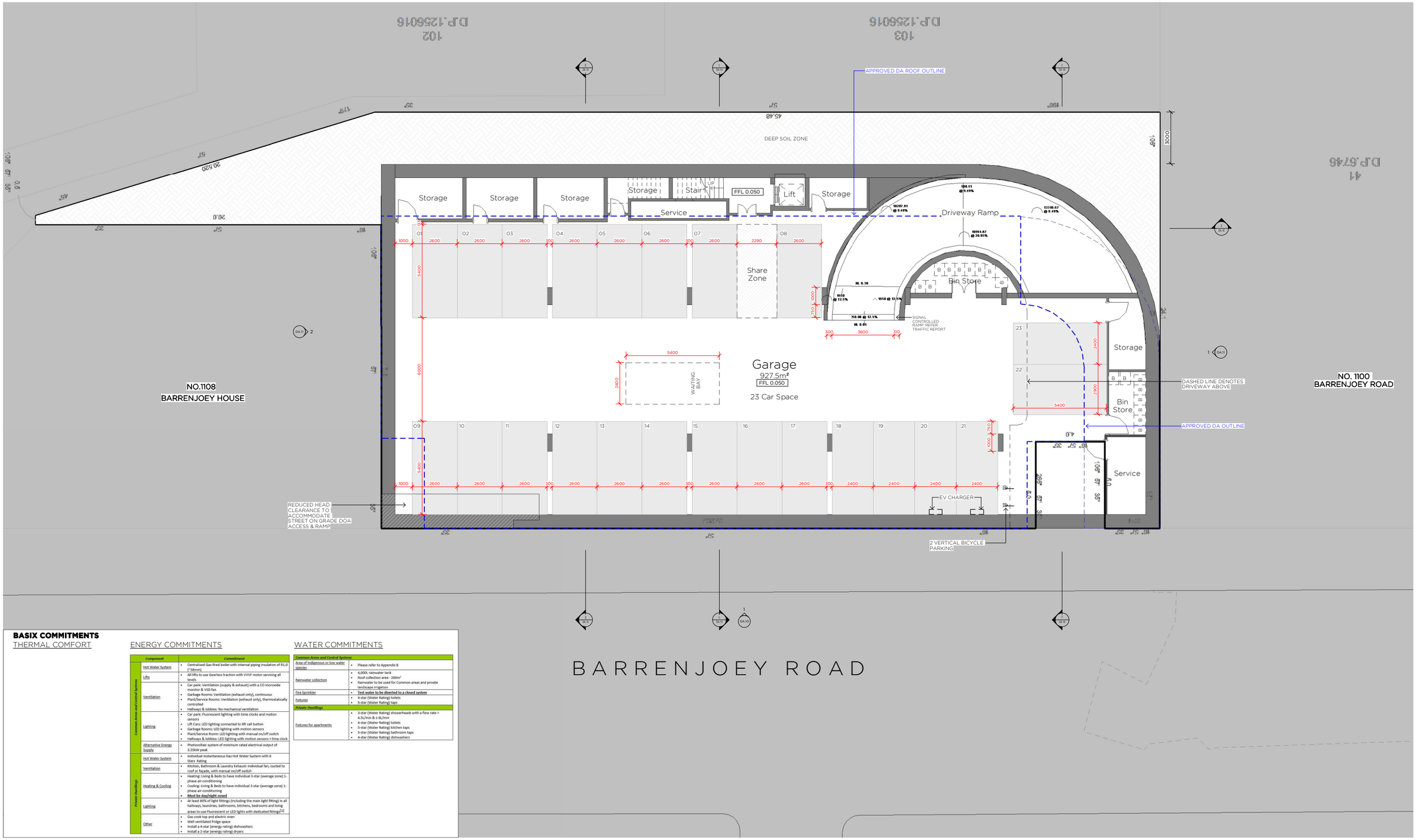
- The traffic generation of the proposed development has been estimated to be some **27**-vehicle trip during the AM (13 in, 14 out) and PM (14 in, 13 out) peak hour periods, respectively. This results in a net change of traffic generation of **+8** vehicle trips during the AM (+4 in, +4 out) and PM (+4 in, +4 out) peak hour periods, respectively, when compared to the approved scale of the subject site.

- The traffic generation expected at the proposed driveway is in the order of **11** vehicle trips in the AM (7 in, 4 out) and PM (4 in, 7 out) peak hour periods. This level of traffic is not expected to impact the operations of Barrenjoey Road, with the proposed design catering for more than the 98th percentile queue. It is noted that no queues are expected to protrude into the footpath area as detailed in **Annexure C**.

- The traffic generated by the proposed development is minimal when considering the existing traffic volumes in the local area and the existing approval of the site and will not adversely affect the performance of nearby critical intersections or the existing road network, particularly in terms of Level of Service, traffic flow efficiency and road safety considerations.

ANNEXURE A: PROPOSED PLANS

(2 SHEETS)



BASIX COMMITMENTS

THERMAL COMFORT

ENERGY COMMITMENTS

	Component	Commitment
Common Areas and Central Systems	Hot Water System	• Centralised Gas-fired boiler with internal piping insulation of R1.0 (~38mm)
	Lifts	• All lifts to use Gearless traction with VVVF motor servicing all levels
	Ventilation	• Car park: Ventilation (supply & exhaust) with a CO monoxide monitor & VSD fan • Garbage Rooms: Ventilation (exhaust only), continuous • Plant/Service Rooms: Ventilation (exhaust only), thermostatically controlled • Hallways & lobbies: No mechanical ventilation
	Lighting	• Car park: Fluorescent lighting with time clocks and motion sensors • Lift Cars: LED lighting connected to lift call button • Garbage Rooms: LED lighting with motion sensors • Plant/Service Room: LED lighting with manual on/off switch • Hallways & lobbies: LED lighting with motion sensors + time clock
	Alternative Energy Supply	• Photovoltaic system of minimum rated electrical output of 3.35kW peak
Private Dwellings	Hot Water System	• Individual Instantaneous Gas Hot Water System with 6 Stars Rating
	Ventilation	• Kitchen, Bathroom & Laundry Exhaust: Individual fan, ducted to roof or façade, with manual on/off switch
	Heating & Cooling	• Heating: Living & Beds to have individual 3-star (average zone) 1-phase air-conditioning • Cooling: Living & Beds to have individual 3-star (average zone) 1-phase air-conditioning • **Must be day/night zoned**
	Lighting	• At least 80% of light fittings (including the main light fitting) in all hallways, laundries, bathrooms, kitchens, bedrooms and living areas to use Fluorescent or LED lights with dedicated fittings[1]
	Other	• Gas cook top and electric oven • Well ventilated fridge space • Install a 4-star (energy rating) dishwashers • Install a 2-star (energy rating) dryers

WATER COMMITMENTS

Common Areas and Central Systems	
Area of Indigenous or low water species	• Please refer to Appendix B
Rainwater collection	• 4,000L rainwater tank • Roof collection area - 200m² • Rainwater to be used for Common areas and private landscape irrigation
Fire Sprinkler	• **Test water to be diverted to a closed system**
Fixtures	• 4-star (Water Rating) toilets • 5-star (Water Rating) taps
Private Dwellings	
Fixtures for apartments	• 3-star (Water Rating) showerheads with a flow rate > 4.5L/min & ≤ 6L/min • 4-star (Water Rating) toilets • 5-star (Water Rating) kitchen taps • 5-star (Water Rating) bathroom taps • 4-star (Water Rating) dishwashers

REV	NOTES	DATE
1	S4.55(2) MODIFICATION APPLICATION	15.04.21

PROJECT NAME & DESCRIPTION
PALM BEACH APARTMENTS
AT
1102 BARRENJOEY ROAD, PALM BEACH

TITLE
PROPOSED BASEMENT PLAN

0 1 5m

PROJECT OVERVIEW
S4.55(2) MODIFICATION APPLICATION
Not to be used for construction purposes

Job No.	2006	Scale.	1 : 100 @ A1
Drawn by.	Author	Drawing No.	Rev
Rev Date.	15.04.21	DA.05	1

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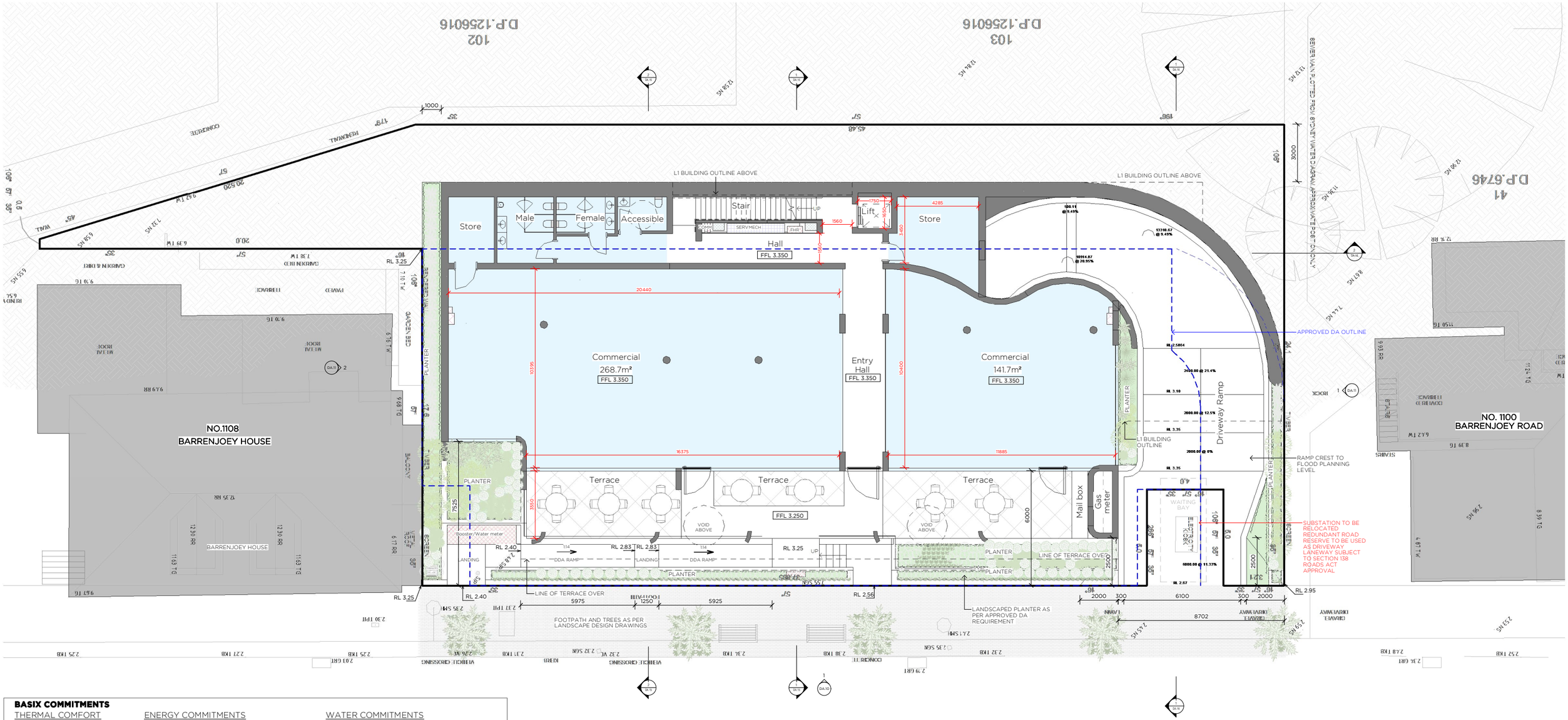

BARRENJOEY ROAD

BASIX COMMITMENTS

THERMAL COMFORT

ENERGY COMMITMENTS

	Component	Commitment
Common Areas and Central Systems	Hot Water System	• Centralised Gas-fired boiler with internal piping insulation of R1.0 (~38mm)
	Lifts	• All lifts to use Gearless traction with VVVF motor servicing all levels
	Ventilation	• Car park: Ventilation (supply & exhaust) with a CO monoxide monitor & VSD fan • Garbage Rooms: Ventilation (exhaust only), continuous • Plant/Service Rooms: Ventilation (exhaust only), thermostatically controlled • Hallways & lobbies: No mechanical ventilation
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	Ventilation	• Kitchen, Bathroom & Laundry Exhaust: Individual fan, ducted to roof or façade, with manual on/off switch
	Heating & Cooling	• Heating: Living & Beds to have individual 3-star (average zone) 1-phase air-conditioning • Cooling: Living & Beds to have individual 3-star (average zone) 1-phase air-conditioning • **Must be day/night zoned**
	Lighting	• At least 80% of light fittings (including the main light fitting) in all hallways, laundries, bathrooms, kitchens, bedrooms and living areas to use Fluorescent or LED lights with dedicated fittings[24]
	Other	• Gas cook top and electric oven • Well ventilated fridge space • Install a 4-star (energy rating) dishwashers • Install a 2-star (energy rating) dryers

WATER COMMITMENTS

Common Areas and Central Systems	
Area of Indigenous or low water species	• Please refer to Appendix B
Rainwater collection	• 4,000L rainwater tank • Roof collection area - 200m² • Rainwater to be used for Common areas and private landscape irrigation
Fire Sprinkler	• **Test water to be diverted to a closed system**
Fixtures	• 4-star (Water Rating) toilets • 5-star (Water Rating) taps
Private Dwellings	
Fixtures for apartments	• 3-star (Water Rating) showerheads with a flow rate > 4.5L/min & < 6L/min • 4-star (Water Rating) toilets • 5-star (Water Rating) kitchen taps • 5-star (Water Rating) bathroom taps • 4-star (Water Rating) dishwashers

REV	NOTES	DATE
1	S4.55(2) MODIFICATION APPLICATION	15.04.21

PROJECT NAME & DESCRIPTION
PALM BEACH APARTMENTS
AT
1102 BARRENJOEY ROAD, PALM BEACH

TITLE
PROPOSED GROUND FLOOR PLAN

0 1 5m

PROJECT OVERVIEW
S4.55(2) MODIFICATION APPLICATION
Not to be used for construction purposes

Job No.	2006	Scale.	1 : 100 @ A1
Drawn by.	Author	Drawing No.	Rev
Rev Date.	15.04.21	DA.06	1

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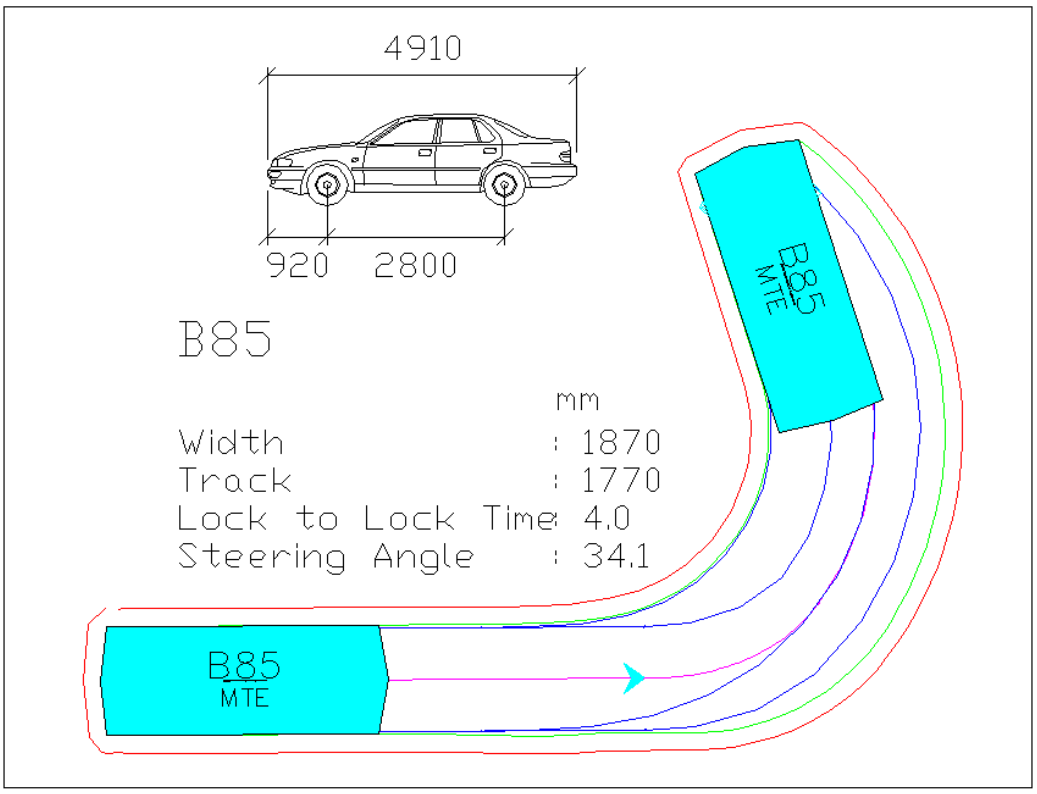
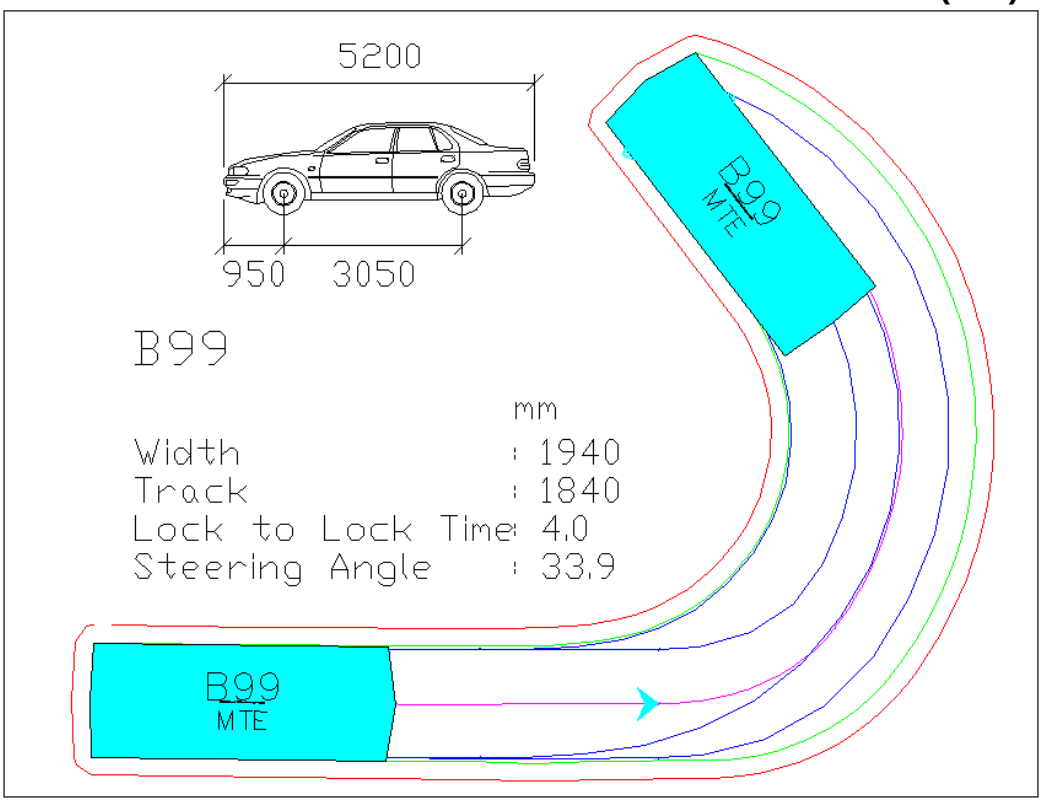
ANNEXURE B: SWEPT PATH TESTING

AND REQUIRED CHANGES

(9 SHEETS)



AUSTRALIAN STANDARD 85TH PERCENTILE SIZE VEHICLE (B85)

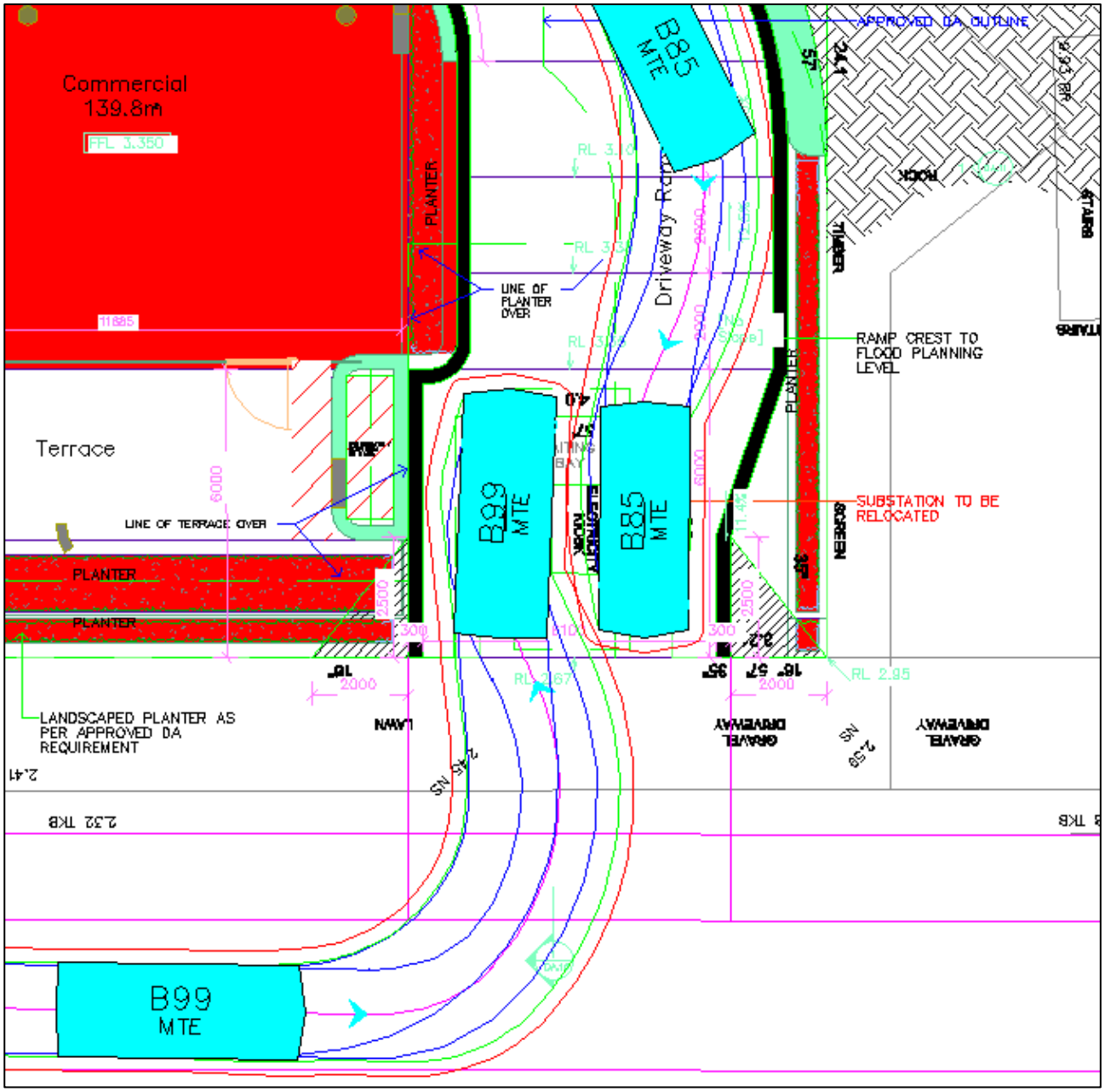


AUSTRALIAN STANDARD 99.8TH PERCENTILE SIZE VEHICLE (B99)

Blue – Tyre Path

Green – Vehicle Body

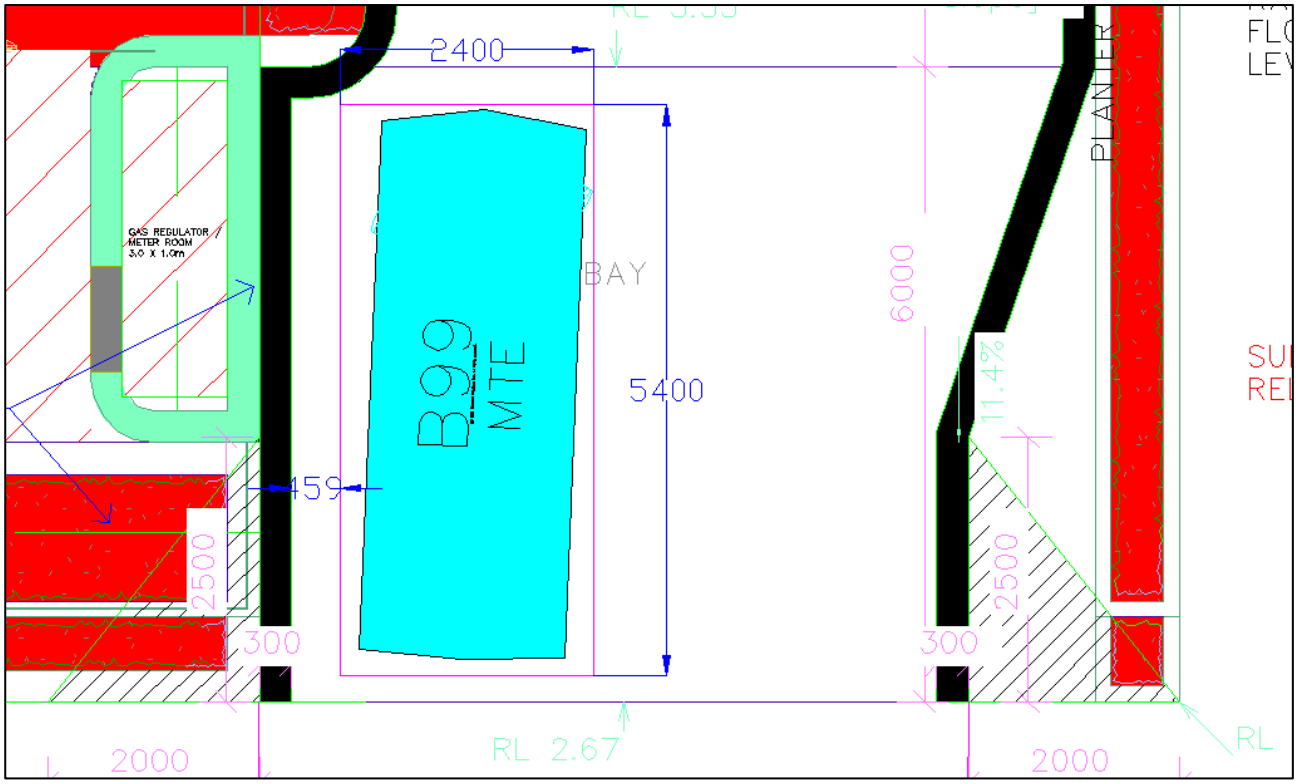
Red – 300mm Clearance



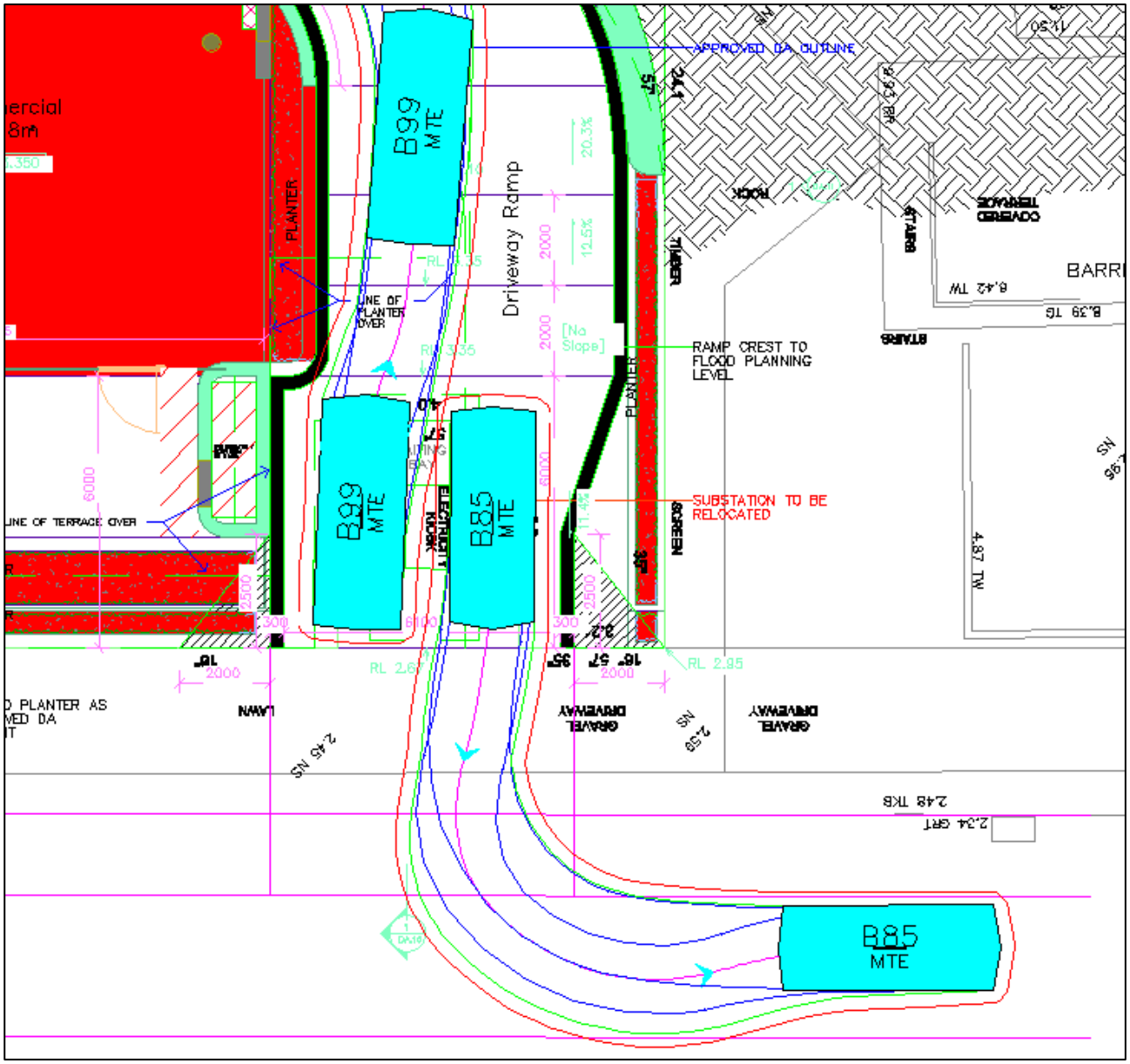
B99 / B85 PASSING AT PROPERTY BOUNDARY

Successful

Note: The location of the line marked waiting bay shown on the plans should be adjusted to allow for two-way passing as shown.



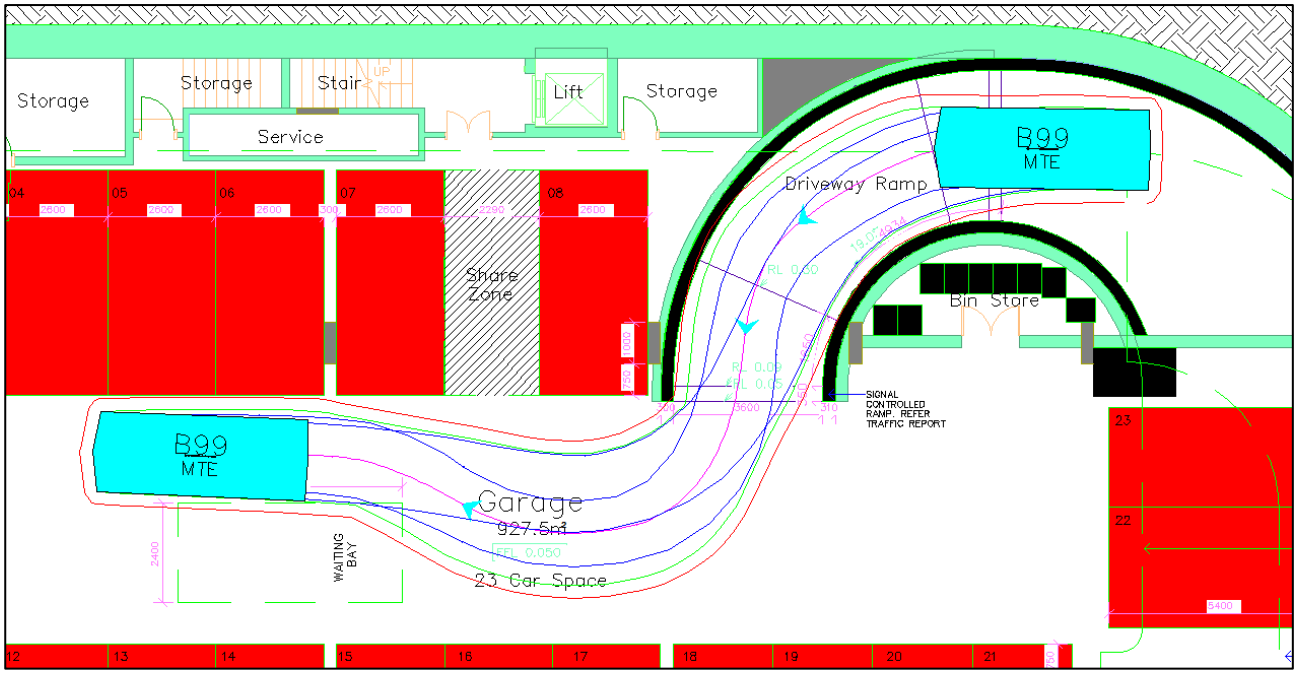
LOCATION OF WAITING BAY



B99 / B85 AFTER PASSING AT PROPERTY BOUNDARY

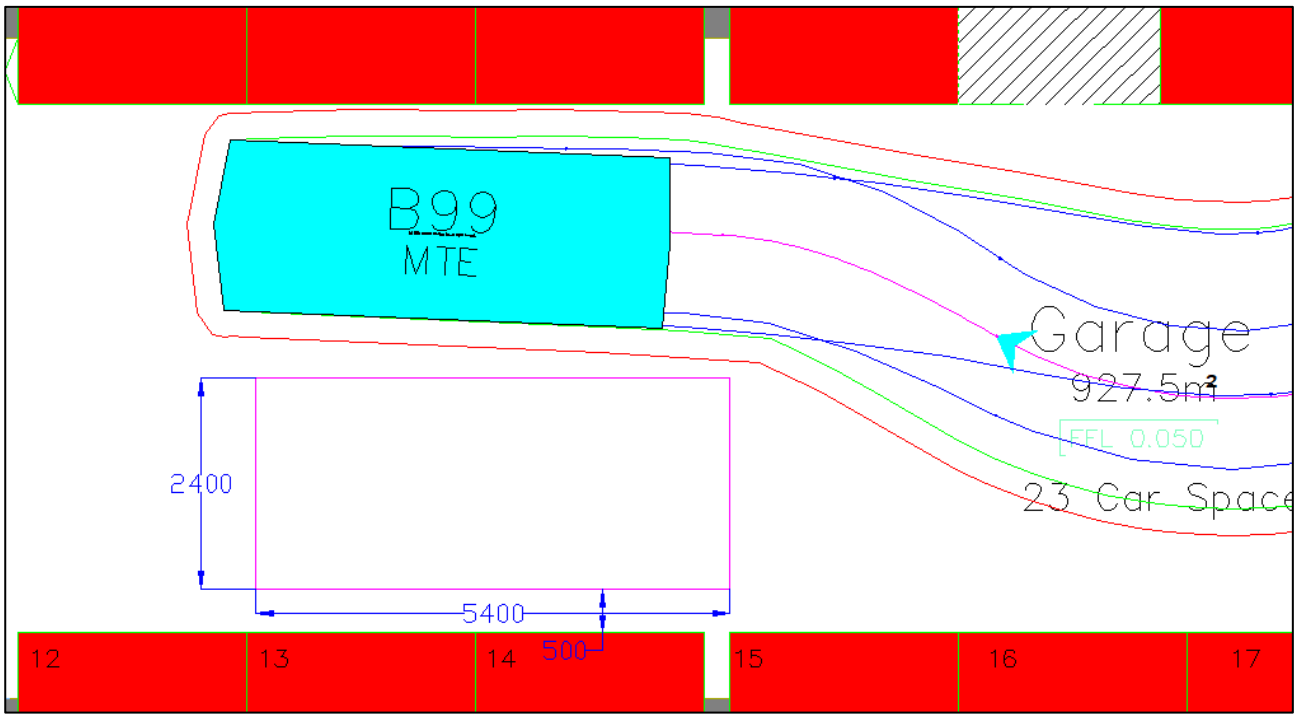
Successful

Note: Subject to relocation of waiting bay as shown above.



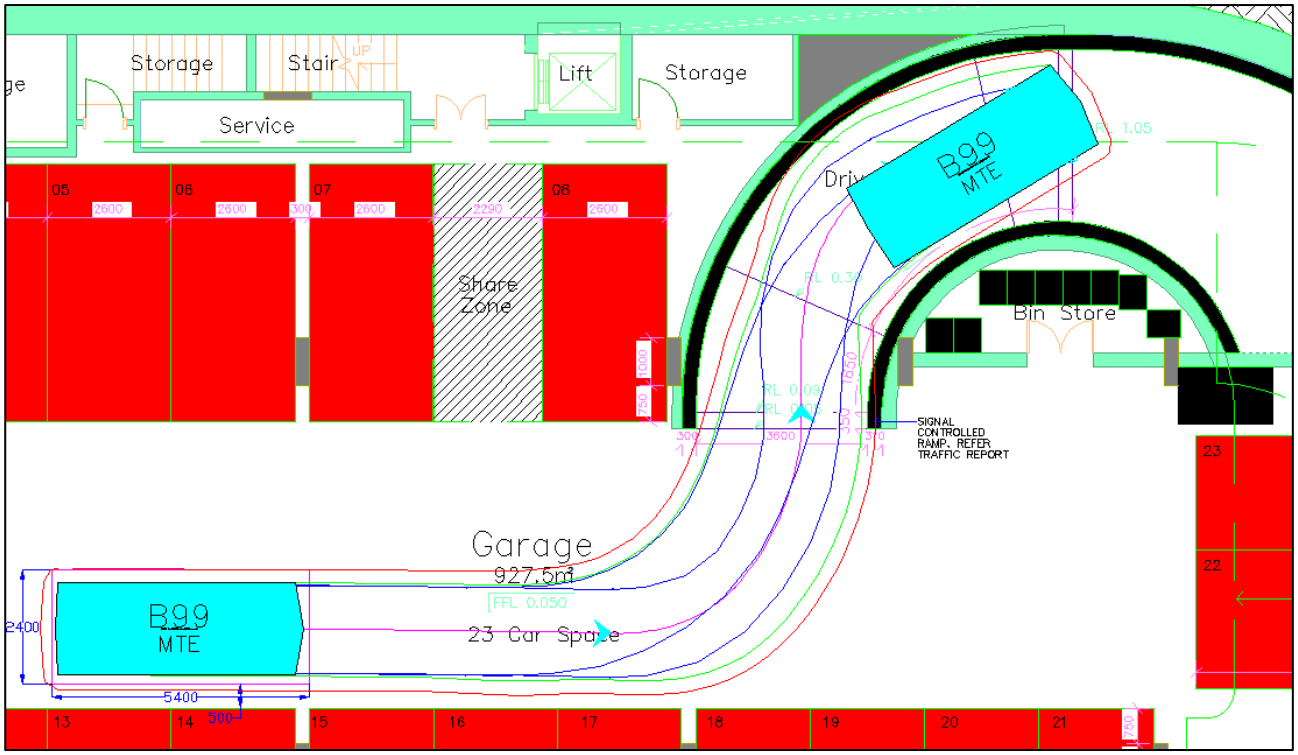
B99 ENTRY TO BASEMENT

Successful subject to relocation of waiting bay as show below.

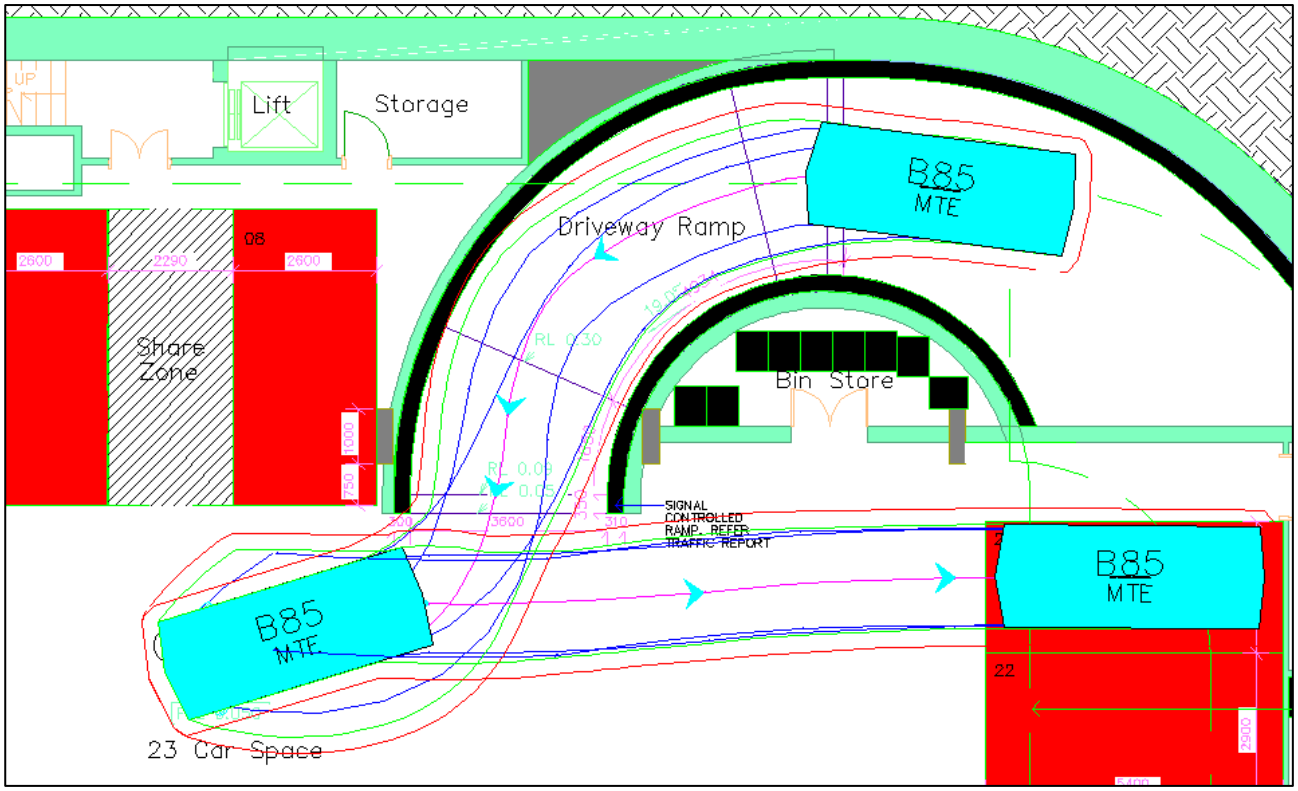


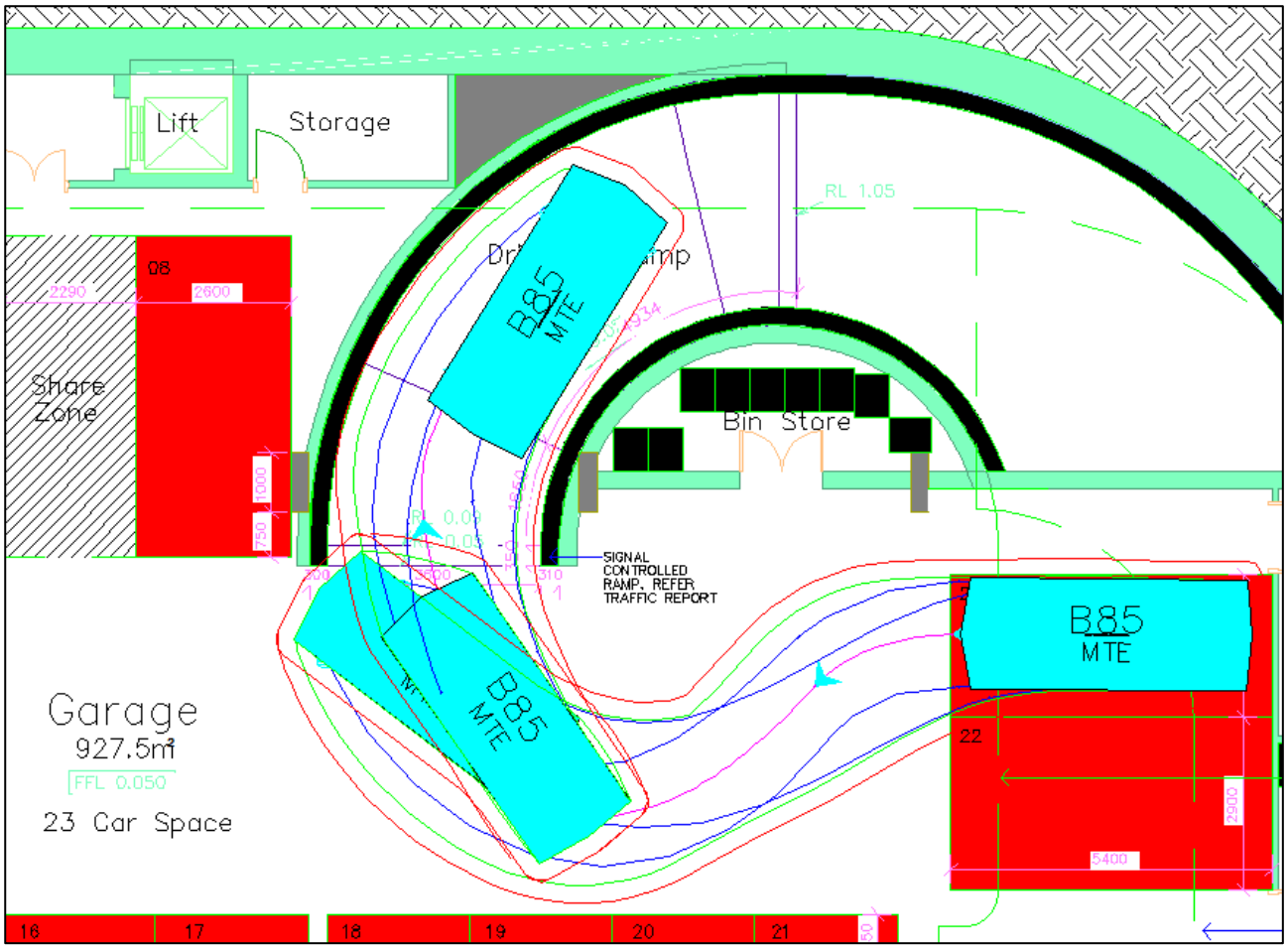
WAITING BAY LOCATION

To be detailed as shown to ensure passing is available for vehicles in the basement.



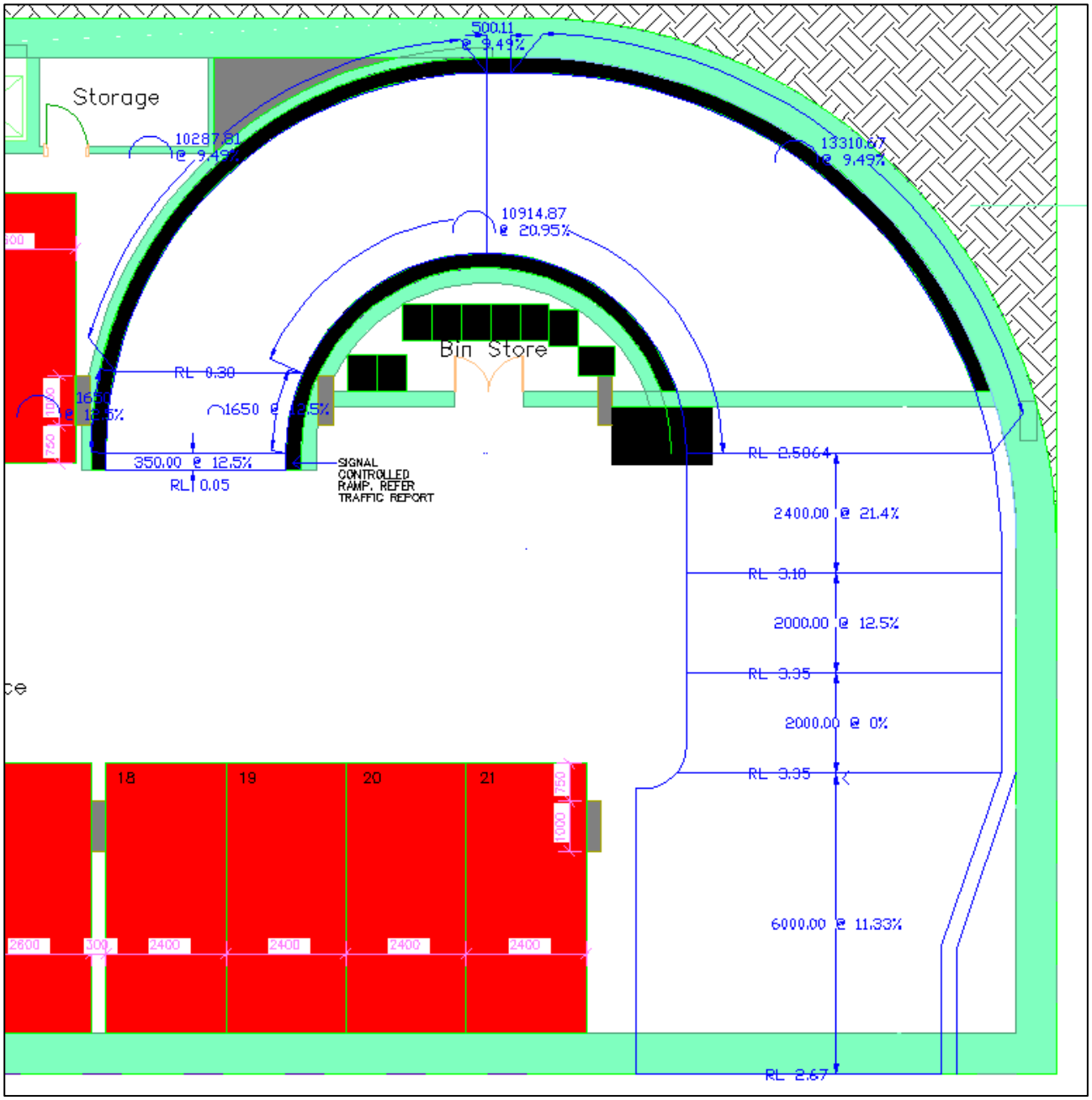
B99 EXIT FROM BASEMENT FROM NEW WAITING BAY
Successful





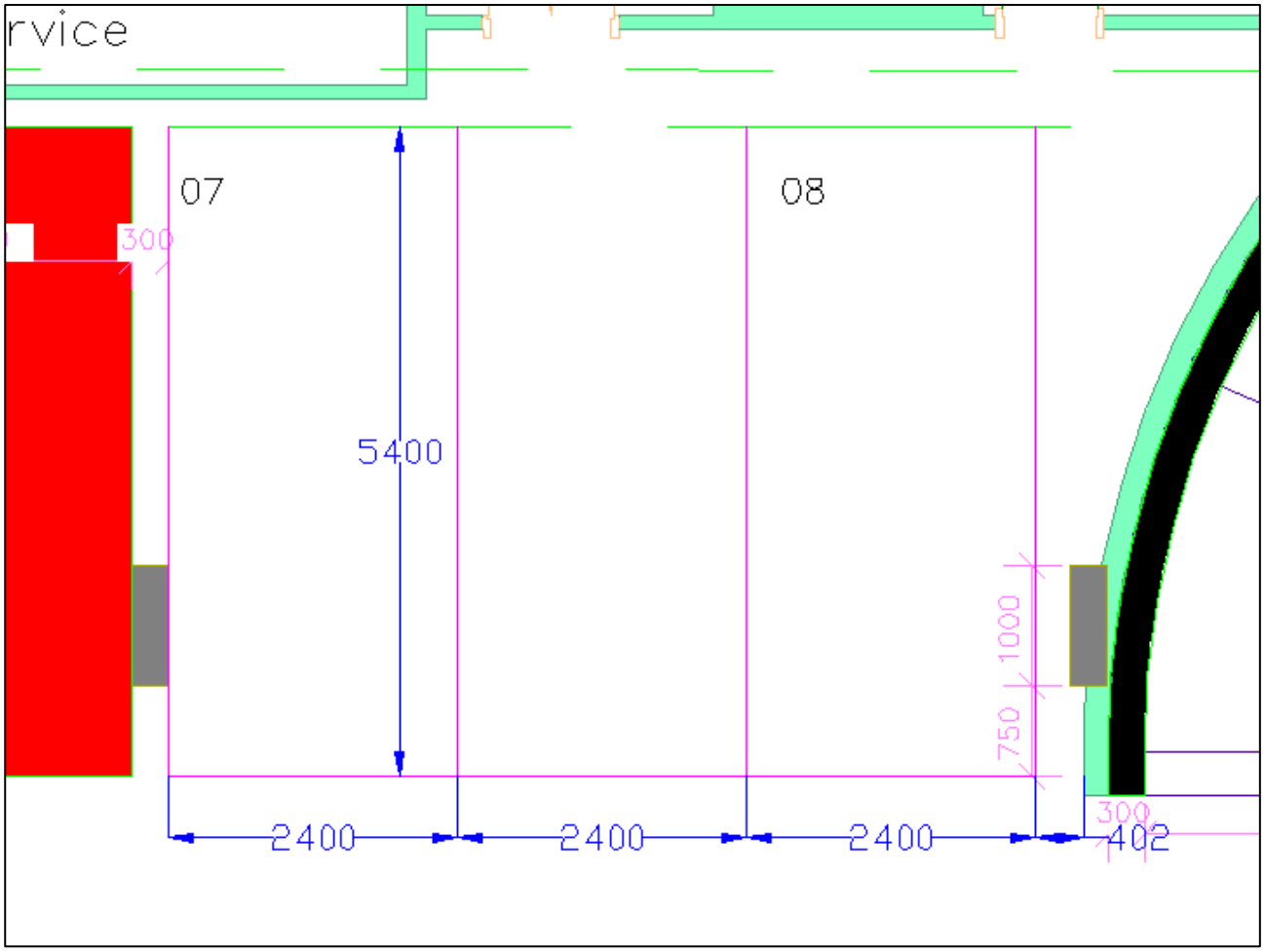
B85 ENTRY / EXIT FROM SPACE 25

Successful – 2 Manoeuvres REVERSE IN / 3 Manoeuvres FORWARD OUT



RAMP GRADIENTS TO BE DESIGNED AS SHOWN

Gradients achieve relevant standards and achieves desired RLs.



REDESIGN OF SPACE 7 AND SPACE 8

Allows for 2.4m width compared shared space and 300mm offset to ramp structure.

Allows for the provision of two (2) disabled car parking spaces in accordance with *AS2890.6:2009* design standards.

ANNEXURE C: QUEUING ANALYSIS

(1 SHEET)

Queuing Analysis

A queuing analysis has been undertaken to assess the probability of conflict of vehicles on the one-way length of ramp leading providing access to the basement car parking area. The following inputs and assumptions were used to conduct this assessment:

- Traffic generation of **11** vehicles trips (7 in, 4 out) during the AM peak hour period accessing the subject driveway as outlined in **Section 4**:
    - It is noted that the PM peak hour period traffic generation is also **11** vehicle trips (4 in, 7 out) and will exhibit the same results.
- The length of conflict (i.e. being the length of which two-way passing is unable to occur) is approximately **40m**.
- At a conservative speed of 5km/h, a length of 40m takes **30 seconds** (rounded up from 28.8) to traverse.

To reiterate, a number of conservative assumptions have been applied, providing for a conservative assessment, with the likely real-world scenario operating with lower conflicts. In any case, the probability of vehicular conflict along the driveway during the AM peak hour period with application of the above conservative assumptions, is calculated below.

$$Likelihood\ of\ Conflict = (Likelihood\ of\ Entering\ Vehicle * Likelihood\ of\ Exiting\ Vehicle) + (Likelihood\ of\ Exiting\ Vehicle * Likelihood\ of\ Entering\ Vehicle)$$

$$Likelihood\ of\ Conflict = \left(\frac{30\frac{sec}{veh} * 7\ veh}{3600\ sec} * \frac{30\frac{sec}{veh} * 4\ veh}{3600\ sec}\right) + \left(\frac{30\frac{sec}{veh} * 4\ veh}{3600\ sec} * \frac{30\frac{sec}{veh} * 7\ veh}{3600\ sec}\right)$$

$$Likelihood\ of\ Conflict = \left(\frac{7}{120} * \frac{1}{30}\right) + \left(\frac{1}{30} * \frac{7}{120}\right)$$

$$\begin{aligned} Likelihood\ of\ Conflict &= 0.00389 = \mathbf{0.389\%}\ \boldsymbol{of\ AM\ peak\ hours} \\ &= Occurs\ once\ every\ \mathbf{257}\ AM\ peak\ hours \\ &= Occurs\ once\ every\ \mathbf{1.02}\ years \end{aligned}$$

It is evident that the likelihood of one vehicle inbound and one vehicle outbound wanting to access the 17m length of restricted width of the driveway is extremely low, with the likelihood being once every **257 AM peak hour periods**. This achieves the required 98th percentile queue, with the likelihood of vehicles queuing across the footpath in the verge highly unlikely.

In the extremely unlikely circumstance that two cars arrive at one time, the proposed driveway configuration can store two (2) vehicles without protruding into the pedestrian footpath area. It is noted that this is one (1) vehicle in the waiting bay and one (1) vehicle behind, slightly within Councils land (where the substation currently is located).