

Acoustic Report: DA Stage

Lot 9001 (#1) Flinders Parade, Middleton Beach

Reference: 22097595-02

Prepared for:
Pacifica Ausglobal Albany Pty Ltd

Reference: 22097595-02

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1. INTRODUCTION

It is proposed to construct a hotel development at Lot 9001 (#1) Flinders Parade, Middleton Beach as generally located in *Figure 1-1*. The development (refer *Appendix A* plans) consists of:

- Ground floor car parking, back of house, retail and F&B tenancy;
- Level 1 car parking and serviced apartments; and
- Level 2 to Level 7 serviced apartments, reducing in number for each floor.



Figure 1-1: Site Locality

With regard to acoustics, the following will need to be addressed as the design progresses:

- Noise emissions – considering noise from the proposed F&B tenancy and mechanical plant against the requirements of the *Environmental Protection (Noise) Regulations 1997*;
- Noise separation – considering construction requirements to satisfy *National Construction Code (NCC) Volume One Building Code of Australia (BCA) Part F5*; and
- Noise intrusion - in this case from general ambient noise and surrounding commercial properties.

This report provides a broad overview of how the acoustics will be managed for the project with further detail following DA.

Appendix C contains a description of some of the terminology used throughout this report.

2. CRITERIA

Each of the relevant criteria are discussed in the following sections. Compliance with these will be further worked through during detailed design.

2.1. Noise Emissions

Environmental noise in Western Australia is governed by the *Environmental Protection Act 1986*, through the *Environmental Protection (Noise) Regulations 1997* (the Regulations or EPNR). Regulations 7, 8 and 9 prescribe the allowable noise levels:

“7. Prescribed standard for noise emissions

- (1) *Noise emitted from any premises or public place when received at other premises –*
- (a) *must not cause, or significantly contribute to, a level of noise which exceeds the assigned level in respect of noise received at premises of that kind; and*
 - (b) *must be free of –*
 - (i) *tonality; and*
 - (ii) *impulsiveness; and*
 - (iii) *modulation,**when assessed under regulation 9.*
- (2) *For the purposes of subregulation (1)(a), a noise emission is taken to significantly contribute to a level of noise if the noise emission ... exceeds a value which is 5 dB below the assigned level.”*

Tonality, impulsiveness and modulation are defined in regulation 9 (refer *Appendix C*). Under regulation 9(3), “noise is to be taken to be free of these characteristics if:

- (a) *the characteristics cannot be reasonably and practicably removed by techniques other than attenuating the overall level of noise emission; and*
- (b) *the noise emission complies with the standard prescribed under regulation 7(1)(a) after the adjustments in the table [Table 2-1] are made to the noise emission as measured at the point of reception.”*

Table 2-1 EPNR Adjustments Where Characteristics Cannot Be Removed

Where Noise Emission is Not Music			Where Noise Emission is Music	
Tonality	Modulation	Impulsiveness	No Impulsiveness	Impulsiveness
+ 5 dB	+ 5 dB	+ 10 dB	+ 10 dB	+ 15 dB

Note: The above are cumulative to a maximum of 15dB.

The assigned levels (prescribed standards) for all premises are specified in regulation 8(3) and are shown in *Table 2-2*. The L_{A10} assigned level is applicable to noises present for more than 10% of a representative assessment period, generally applicable to “steady-state” noise sources. The L_{A1} is for short-term noise sources present for less than 10% and more than 1% of the time. The L_{Amax} assigned level is applicable for incidental noise sources, present for less than 1% of the time.

Table 2-2 EPNR Baseline Assigned Levels

Premises Receiving Noise	Time Of Day	Assigned Level (dB)		
		L_{A10}	L_{A1}	L_{Amax}
Noise sensitive premises: highly sensitive area ¹	0700 to 1900 hours Monday to Saturday (Day)	45 + influencing factor	55 + influencing factor	65 + influencing factor
	0900 to 1900 hours Sunday and public holidays (Sunday)	40 + influencing factor	50 + influencing factor	65 + influencing factor
	1900 to 2200 hours all days (Evening)	40 + influencing factor	50 + influencing factor	55 + influencing factor
	2200 hours on any day to 0700 hours Monday to Saturday and 0900 hours Sunday and public holidays (Night)	35 + influencing factor	45 + influencing factor	55 + influencing factor
Noise sensitive premises: any area other than highly sensitive area	All hours	60	75	80
Commercial Premises	All hours	60	75	80
Industrial and Utility Premises	All hours	65	80	90

1. *highly sensitive area* means that area (if any) of noise sensitive premises comprising —

- (a) a building, or a part of a building, on the premises that is used for a noise sensitive purpose; and
- (b) any other part of the premises within 15 metres of that building or that part of the building.

The influencing factor (IF), in relation to noise received at noise sensitive premises, has been calculated as 3 dB, as determined in *Appendix B*. *Table 2-3* shows the assigned noise levels including the influencing factor and transport factor at the receiving locations.

Table 2-3 EPNR Assigned Levels

Premises Receiving Noise	Time Of Day	Assigned Level (dB)		
		L _{A10}	L _{A1}	L _{Amax}
Nearest Noise Sensitive Premises (Future R1) Noise sensitive premises: highly sensitive area ¹	0700 to 1900 hours Monday to Saturday (Day)	48	58	68
	0900 to 1900 hours Sunday and public holidays (Sunday)	43	53	68
	1900 to 2200 hours all days (Evening)	43	53	58
	2200 hours on any day to 0700 hours Monday to Saturday and 0900 hours Sunday and public holidays (Night)	38	48	58

The assigned levels are statistical levels and therefore the period over which they are determined is important. The Regulations define the Representative Assessment Period (RAP) as *a period of time of not less than 15 minutes, and not exceeding 4 hours*, which is determined by an *inspector* or *authorised person* to be appropriate for the assessment of a noise emission, having regard to the type and nature of the noise emission. An *inspector* or *authorised person* is a person appointed under Sections 87 & 88 of the *Environmental Protection Act 1986* and include Local Government Environmental Health Officers and Officers from the Department of Environment Regulation. Acoustic consultants or other environmental consultants are not appointed as an *inspector* or *authorised person*. Therefore, whilst this assessment is based on a 4-hour RAP, which is assumed to be appropriate given the nature of the operations, this is to be used for guidance only.

2.2. Noise Separation

Discussed in this section are the requirements for acoustic separation within the development itself (e.g. hotel room to hotel room). The minimum standards are provided in the *National Construction Code* (NCC), with the Association of Australasian Acoustical Consultants (AAAC) *Guideline for Apartment and Townhouse Acoustic Rating* mentioned also for developments wanting better than minimum acoustics. Some hotels also have their own acoustic requirements, which will be reviewed as the design progresses, if such requirements exist.

2.2.1. National Construction Code

It is a requirement under the *National Construction Code* (NCC) for sound transmission and insulation to be considered. In this case, the relevant volume of the NCC is Volume One of the *Building Code of Australia, Class 2 to Class 9 Buildings* (BCA) and specifically Part F5. Where the term sole-occupancy unit (SOU) is used, this refers to one within a Class 2 or 3 building.

The Objective of Part F5 as stated in *Guide to NCC Volume One* is to:

“...safeguard occupants from illness or loss of amenity as a result of undue sound being transmitted –

- (a) Between adjoining sole-occupancy units; and*
- (b) From common spaces to sole-occupancy units; and*
- (c) From parts of different classifications to sole-occupancy units.”*

The BCA separates the performance requirements into floors and walls for Class 2 and 3 buildings as follows:

“FP5.1 Sound Transmission Through Floors

Floors separating –

- (a) sole-occupancy units: or*
- (b) a sole occupancy unit from a plant room, lift shaft, stairway, public corridor, public lobby, or the like, or a part of a different classification, must provide insulation against the transmission of airborne and impact generated sound sufficient to prevent illness or loss of amenity to the occupants.*

FP5.2 Sound Transmission Through Walls

Walls separating sole-occupancy units or a sole-occupancy unit from a plant room, lift shaft, stairway, public corridor, public lobby, or the like, or parts of a different classification, must provide insulation against the transmission of –

- (a) airborne sound; and*
- (b) impact generated sound, if the wall is separating a bathroom, sanitary compartment, laundry or kitchen in one sole-occupancy unit from a habitable room (other than a kitchen) in an adjoining unit, sufficient to prevent illness or loss of amenity to the occupants.*

Note as kitchens generally form part of an open plan area, these are also treated as habitable spaces.

FP5.3 Sound Transmission Through Floor and Wall Penetrations and Door Assemblies

The required sound insulation of a floor or a wall must not be compromised by -

- (a) The incorporation or penetration of a pipe or other service element; or
- (b) A door assembly.”

In order to satisfy FP5.1 to FP5.3, building elements are to satisfy the minimum acoustic performances nominated in *Table 2-4*, being a summary of the Deemed-to-Satisfy Provisions provided in F5.1 to F5.7 (Laboratory Tests) and Verification Methods provided in FV5.1 and FV5.2 (Field/On-Site Tests).

Table 2-4 NCC Deemed-to-Satisfy Provisions and Verification Methods

Description	Deemed-to-Satisfy (Laboratory)	Verification (On-Site)
F5.4 Sound Insulation Rating of Floors & FV5.1 Sound Transmission Through Floors		
Separating SOU's	$R_w + C_{tr} \geq 50$	$D_{nT,w} + C_{tr} \geq 45$
Separating SOU from plant room, lift shaft, stairway, public corridor, public lobby or the like, or parts of a different classification.	$L_{n,w} \leq 62$	$L_{nT,w} \leq 62$
F5.5 Sound Insulation Rating of Walls & FV5.2 Sound Transmission Through Walls		
Separating SOU's	$R_w + C_{tr} \geq 50$	$D_{nT,w} + C_{tr} \geq 45$
Separating SOU from plant room, lift shaft, stairway, public corridor, public lobby or the like, or parts of a different classification.	$R_w \geq 50$	$D_{nT,w} \geq 45$
Separating a bathroom, sanitary compartment, laundry or kitchen in one SOU from a habitable room (other than a kitchen) in an adjoining SOU	Discontinuous Construction	N/A
Separating a SOU from a plant room or lift shaft	Discontinuous Construction	N/A
A door separating SOU from a stairway, public corridor, public lobby or the like.	$R_w \geq 30$	$D_{nT,w} \geq 25$
F5.6 Sound Insulation Rating of Internal Services		
SOU (Habitable) to duct, soil, waste, water supply or storm water (not associated with the SOU)	$R_w + C_{tr} \geq 40$	N/A
SOU (Non-Habitable) to duct, soil, waste, water supply or storm water (not associated with the SOU)	$R_w + C_{tr} \geq 25$	N/A

Discontinuous construction is defined in F5.3(c) as “a wall having a minimum 20mm cavity between 2 separate leaves, and

- (i) For masonry, where wall ties are required to connect leaves, the ties are of the resilient type; and
- (ii) For other than masonry, there is no mechanical linkage between leaves except at the periphery.”

2.2.2. Guideline for Apartment and Townhouse Acoustic Rating (Version 1)

The Association of Australasian Acoustical Consultants (AAAC) developed the *Guideline for Apartment and Townhouse Acoustic Rating* in order to provide a tool to assess the acoustic quality of such developments. With the NCC providing the minimum performance requirements, the AAAC Guideline allows various acoustic elements to be given a star rating, with 2 Star being acoustically poor and 6 Star being acoustically superior. *Table 2-5* provides the star ratings relevant to the NCC. Note that values shown are field performances and for comparison to the Code requirements, the following relationships are assumed:

- $R_w + C_{tr} = D_{nT,w} + C_{tr} + 5$; and
- $L_{n,w} = L_{nT,w}$

Table 2-5 AAAC Guideline Star Rating

Description	2 Star	3 Star	4 Star	5 Star	6 Star
Airborne Sound Insulation for Walls and Floors					
Separating SOU's $D_{nT,w} + C_{tr}$	35	40	45	50	55
Separating SOU Bedroom to Lobby/Corridor $D_{nT,w} + C_{tr}$	30	40	40	45	50
Separating SOU Living to Lobby/Corridor $D_{nT,w} + C_{tr}$	25	40	40	40	45
Separating SOU Living to Lobby/Corridor Via Door $D_{nT,w}$	20	25	30	35	40
Impact Isolation of Floors					
Separating SOU and Any Other Space	65	55	50	45	40
Impact Isolation of Walls (Discontinuous Construction)					
Separating SOU's	No	Yes	Yes	Yes	Yes
Separating SOU and Common Areas	No	No	No	Yes	Yes

With regard to floors separating SOU's it can be seen that meeting the NCC is equivalent to 4 Star performance for the airborne requirement but only 2 Star for the impact requirement.

For walls separating SOU's, the NCC airborne requirement is 4 Star with providing discontinuous construction as a requirement for at least 3 Star.

2.3. Noise Intrusion

Guidance on acceptable noise levels from internal services noise (e.g. air-conditioning) and external noise sources (commercial venues) can be taken from Australian Standard 2107:2016 *Acoustics – Recommended Design Sound Levels and Reverberation Times for Building Interiors* as shown in Table 2-6.

Table 2-6: Design Sound Level Range

Use	Design Sound Level Range, dB L _{Aeq}
Hotels and Motels	
Bars and Lounges	≤ 50
Foyers	45 to 50
Sleeping Areas (Night-time) Hotels and motels in suburbs or near minor roads	30 to 35

Note: Sound levels within the given ranges have been found to be acceptable by most people for the space under consideration. When the sound level is greater than the upper level of the range most people occupying the space will become dissatisfied with the level of sound. When the sound level is below the lower level of the range, the inadequacy of background sound to provide masking sound can become problematic. For example, by allowing other intermittent noise sources to cause distraction, annoyance, lack of privacy etc.

3. NOISE EMISSIONS

Noise modelling will occur as the design progresses with regard to noise from the ground floor F&B and noise from mechanical plant. It is noted that the nearest noise sensitive premises will be the future development to the west. The F&B is well oriented away from this development facing northeast. Similarly, the main plant rooms are oriented to the south, generally away from these future residences.

With regard to these main noise emission sources, the following is noted:

- Food & Beverage Tenancy:
 - Construction between the F&B and apartments above is to be above that required in the NCC (refer *Section 4.2*);
 - Canopy above the alfresco areas is to preferably be solid, with no gaps and of a material having a minimum surface mass of 8 kg/m²;
 - Glazing to apartments overlooking the alfresco area to be upgraded to minimum 10.38mm laminated, with consideration given to double glazing;
 - Acoustic absorption to the underside of the F&B sound-rated ceiling is to be provided to assist with acoustic quality (reverberation control) inside the venue and minimising noise emissions where external glazing is open;
 - All external glass to be minimum 10.38mm thick laminated and achieve minimum R_w 33.
 - All music is to be played through an in-house system, to be kept at low levels appropriate for background music levels. Changing of settings shall be kept within a locked cabinet. Location of speakers shall be such that they are directed inwards, away from the noise sensitive premises. There shall be no subwoofers and no external speakers.
 - The F&B is to develop a Management Plan that covers such things as:
 - Outside the venue is to be patrolled by venue personnel, particularly near closing to ensure no loitering or the like. Patrons exiting the venue will, where necessary, be politely asked to consider neighbours and leave quietly.
 - New patrons shall not enter the venue within 30-minutes of closing.
 - Bottle emptying shall occur within internally if at night-time, otherwise can occur externally during the daytime.
 - Deliveries shall be daytime only;
 - A complaints register shall be established with noise complaints handled by the approved manager at the time and investigated immediately with complaints entered in to the complaints log file.
- Mechanical Plant:
 - All exhaust fans shall be internal to the development and shall be axial fan type (or equivalent), allowing the incorporation of an attenuator if required;
 - Particular attention will be required to the car park ventilation to the communal area;
 - All fans shall be variable speed drive so that maximum speed is only occurring when necessary with demand;
 - Air-conditioning shall have a 'night' / 'quiet' mode option, in case required for prior to 7.00am operation, subject to final detailed analysis;
 - All plant shall be selected for quiet operation;
 - All plant is to be appropriately vibration isolated to 97% isolation efficiency.

4. NOISE SEPARATION

4.1. Separating Walls

At this stage of the project, the construction materials are unknown and will be considered further at detailed design, however a wall mark-up for a typical floor is provided in *Figure 4-1*. This generally shows the minimum performance requirement in accordance with the NCC. Note that where an inter-connecting door is shown, the entire wall has been marked as $R_w + C_{tr} \geq 50$ and Discontinuous Construction and a specialist door will be required in order to maintain reasonable acoustic separation when rooms are occupied by separate occupants. The construction materials will be examined as the design progresses.

$R_w + C_{tr} \geq 50$ & D.C.	
$R_w + C_{tr} \geq 50$	
$R_w \geq 50$ & D.C.	
$R_w \geq 50$	

Note: D.C. is Discontinuous Construction

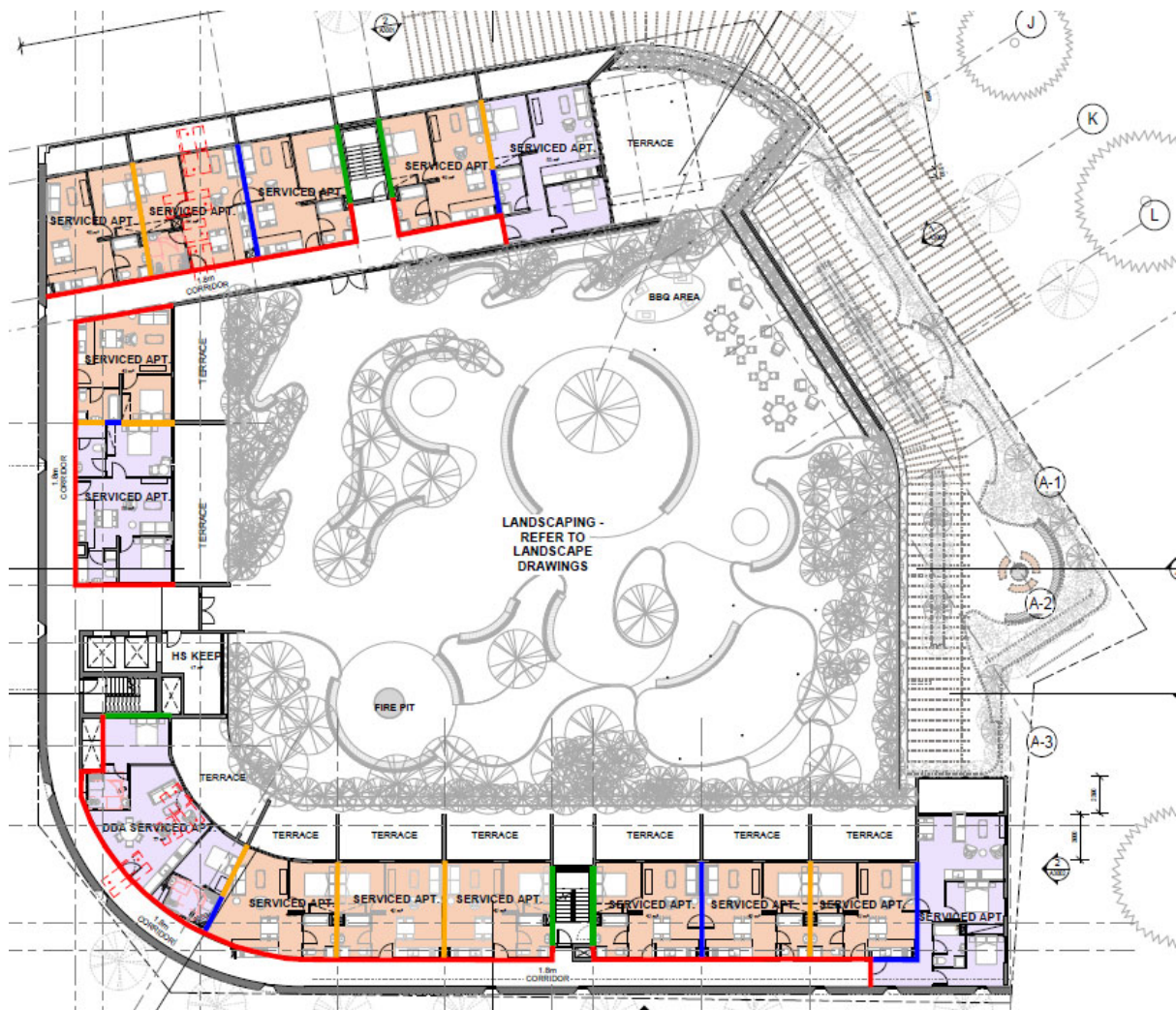


Figure 4-1: Typical Floor Plan Wall Mark-up

4.2. Separating Floors

The acoustic requirements for all floors involving a sole-occupancy unit are the same being $R_w + C_{tr} \geq 50$ and $L_{n,w} \leq 62$, noting the impact requirement only applies when received in a sole-occupancy unit.

Typical construction between floors will comprise the structural slab and suspended ceilings. Where the floor finish is carpet, underlay is required. Where the floor finish is hard (timber, tiles or the like), an impact mat is required.

Other floors that will also require consideration will be those between the F&B and apartments above and those between Level 1 plant rooms and apartments above. The requirements will be dependent on noise levels in these areas, however will likely consist of the concrete slab and resiliently suspended ceiling with insulation above. Indicative floor constructions are provided in *Table 4-1*.

Table 4-1: Possible Floor Constructions

Application	Description	Image
Typical for Separating Apartments	200mm thick concrete slab with - <ul style="list-style-type: none"> • Carpet on underlay; • 75mm thick, 14kg/m³ fibrous insulation above ceiling; • One layer of 13mm plasterboard suspended minimum 100mm from slab on lightweight metal frame. 	
	200mm thick concrete slab with - <ul style="list-style-type: none"> • Timber/Tiles on medium performance impact mat; • 75mm thick, 14kg/m³ fibrous insulation above ceiling; • One layer of 13mm plasterboard suspended minimum 100mm from slab on lightweight metal frame. 	
Separating F&B and Plant Rooms Where Apartment Above	200mm thick concrete slab with - <ul style="list-style-type: none"> • 75mm thick, 14kg/m³ fibrous insulation above ceiling; • Two layers of 13mm sound-rated plasterboard suspended minimum 100mm from slab on lightweight metal frame with resilient mounts. 	

5. NOISE INTRUSION

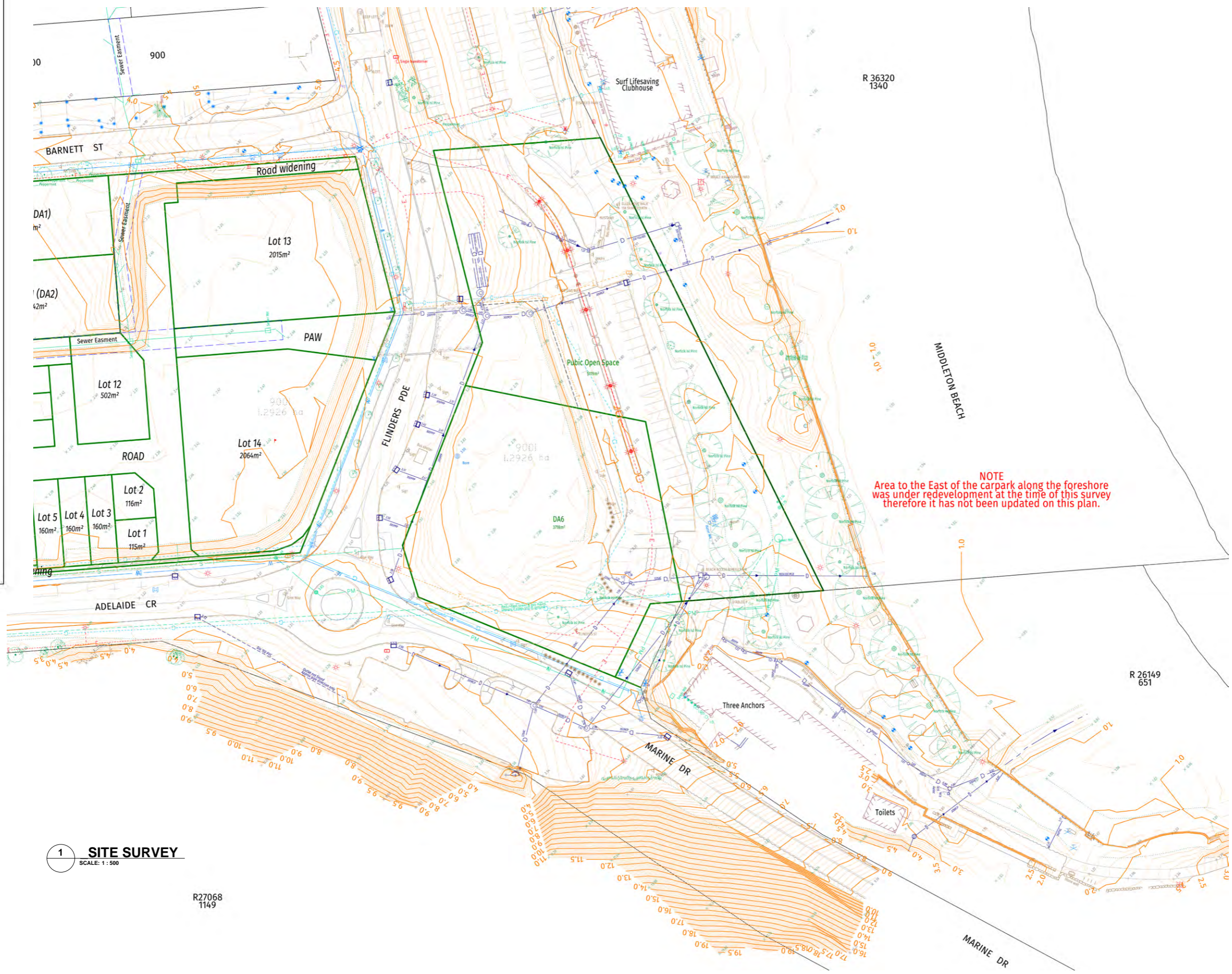
Commercial properties exist to the east, north and further west as described below:

- Three Anchors is the closest venue to the immediate east at around 20 metres.
 - The venue is open prior to 7.00am (night-time in the Noise Regulations), presumably for coffee and breakfast, which is unlikely to generate significant noise;
 - The venue does not provide dinner, closed at 4.00pm at the latest;
 - Is a family friendly venue with playground to the north;
 - From the above, this venue is likely to be noisiest during the day and therefore may not be highly intrusive with other background noise at this time.
- Albany Surf Life Saving Club is located to the northeast at approximately 70 metres.
 - Likely to generate some noise in the early hours of the morning prior to 7.00am, particularly in Summer;
 - May also have a bar open on Friday nights, although with a reasonably early closing time of around 8.00pm and shielded by the club building from the proposed hotel;
 - From the above, this venue may generate some noise prior to 7.00am. Apartments facing this direction will likely have upgraded glazing in any case to minimise noise impacts from the proposed F&B, which will also assist in minimising noise from the Surf Club.
- Hybla Tavern is slightly further away to the north at approximately 100 metres.
 - This venue is open later than the others, although still closed by 10.30pm at the latest, on Friday and Saturday nights;
 - Appears to be focused on good food and general socialising and is not believed to have any live music;
 - It is likely that noise from the developments own F&B will be more significant given the distance and orientation.
- Rats Bar is to the west at around 130 metres;
 - The venue is closed by 9.30pm, being open for lunch and dinner trade;
 - Relatively small venue with no known live music performances;
 - Apartments facing this direction have a corridor and solid wall separating the apartment from the outside of the building.

A detailed assessment will be undertaken of each of these venues in order to determine their potential impacts to the proposed hotel. However, late night noise is not considered to be a significant issue. At this stage, a default minimum glazing of R_w 30 incorporating minimum 6.38mm thick laminated glass is to be adopted to all hotel rooms.

Appendix A – Development Plans

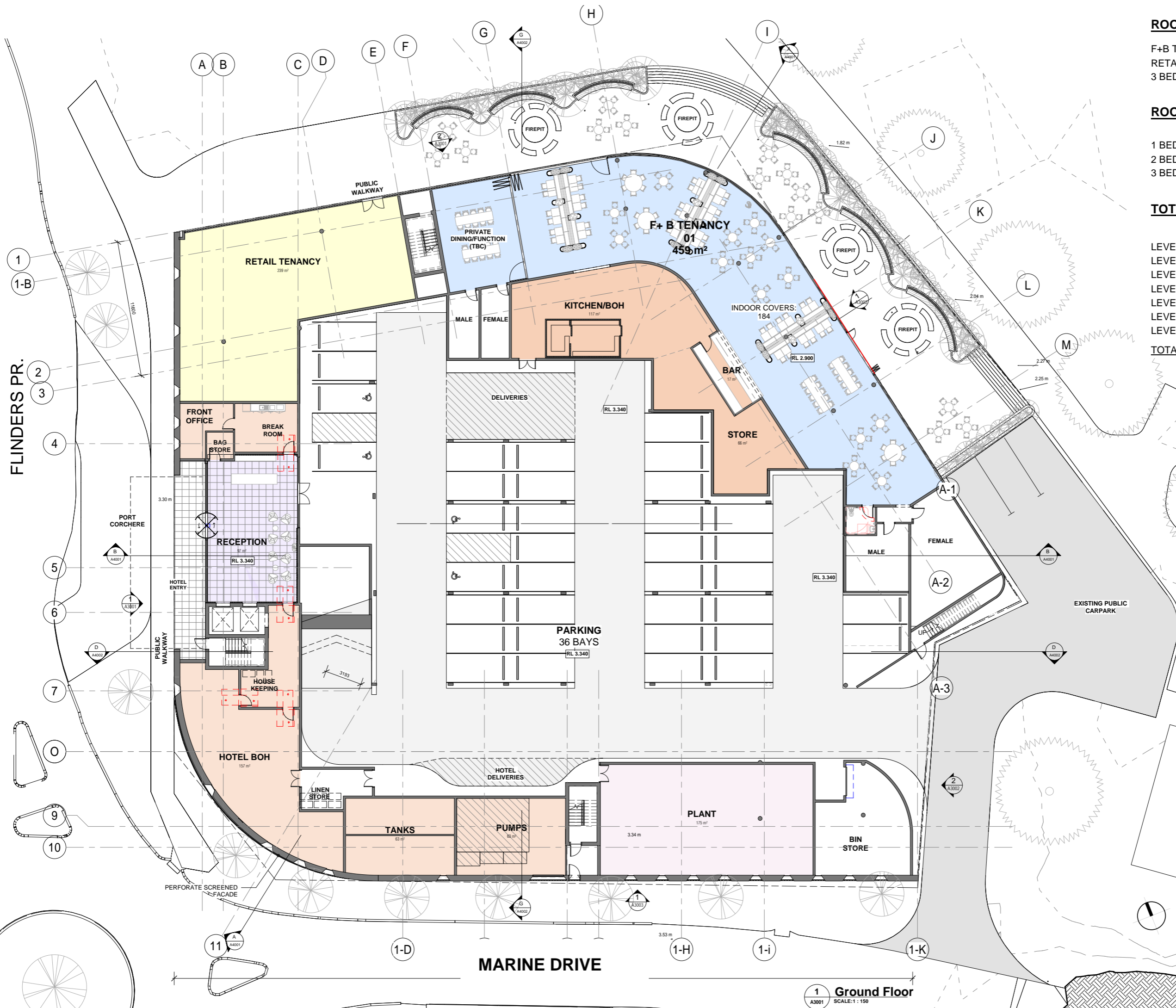
- LEGEND**
- MH (round)
 - Gully
 - MH (square)
 - Pipe Invert
 - Peppermint
 - Retic Sprinkler
 - Retic Control Pt
 - Palm
 - Norfolk Isle Palm
 - Light pole
 - Water valve
 - Gas valve
 - Sewer MH
 - Bollard
 - Multiple Light Pole
 - Tap
 - BV
 - Water marker
 - Meter
 - Power dome
 - Telstra box/pit
 - Control panel
 - Hydrant (ground)
 - Earth pit
 - SV
 - Cable marker
 - Distribution board
 - Sewer MH
 - Double transformer
 - Sewer MH (Not Located, from DBYD)
 - Top of pipe
 - Centreline
 - Change of grade
 - Edge of Gravel
 - Fence
 - Brick wall
 - Edge of Bitumen
 - Bush line
 - Stone wall
 - Building
 - Stone wall
 - Edge of Rock
 - Sewer main
 - Retic pipe
 - Water pipe
 - UG power



1 SITE SURVEY
SCALE: 1 : 500

R27068
1149

Revision schedule		
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ROOM SCHEDULE

F+B TENANCY 01	460m ²
RETAIL 01	167m ²
3 BED	121m ²

ROOM SCHEDULE

1 BED	47	71%
2 BED	16	24%
3 BED	3	5%

TOTAL ROOM SCHEDULE

	1 BED	2 BED	3 BED	
LEVEL 01	10	3	1	14
LEVEL 02	11	4	0	15
LEVEL 03	8	4	0	12
LEVEL 04	6	4	0	10
LEVEL 05	4	2	1	7
LEVEL 06	5	1	1	7
LEVEL 07	3	0	1	4
TOTAL				69

PARKING

GROUND FLOOR	36
LEVEL 1	40
TOTAL	76



Revision schedule

drawn by	checked by	first issue
LZB	CC	-/-

special note:
ALL DIMENSIONS ARE TO BE CHECKED PRIOR TO THE COMMENCEMENT OF WORKS ON SITE

client
PACIFICA

project address
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 GROUND FLOOR PLAN

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BOX
 ARCHITECTURE | INTERIORS

MURRAY MEWS
 329 MURRAY ST
 PERTH WA 6000

1 Ground Floor
 A3001 SCALE: 1:150



ROOM SCHEDULE

F+B TENANCY 01	460m ²
RETAIL 01	167m ²
3 BED	121m ²

ROOM SCHEDULE

1 BED	47	71%
2 BED	16	24%
3 BED	3	5%

TOTAL ROOM SCHEDULE

	1 BED	2 BED	3 BED	
LEVEL 01	10	3	1	14
LEVEL 02	11	4	0	15
LEVEL 03	8	4	0	12
LEVEL 04	6	4	0	10
LEVEL 05	4	2	1	7
LEVEL 06	5	1	1	7
LEVEL 07	3	0	1	4
TOTAL				69

PARKING

GROUND FLOOR	36
LEVEL 1	40
TOTAL	76

Revision schedule

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special note:
ALL DIMENSIONS ARE TO BE CHECKED PRIOR TO THE COMMENCEMENT OF WORKS ON SITE

client
PACIFICA

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 drawing name
 LEVEL 1 PLAN

drawing #
21009/ A1004

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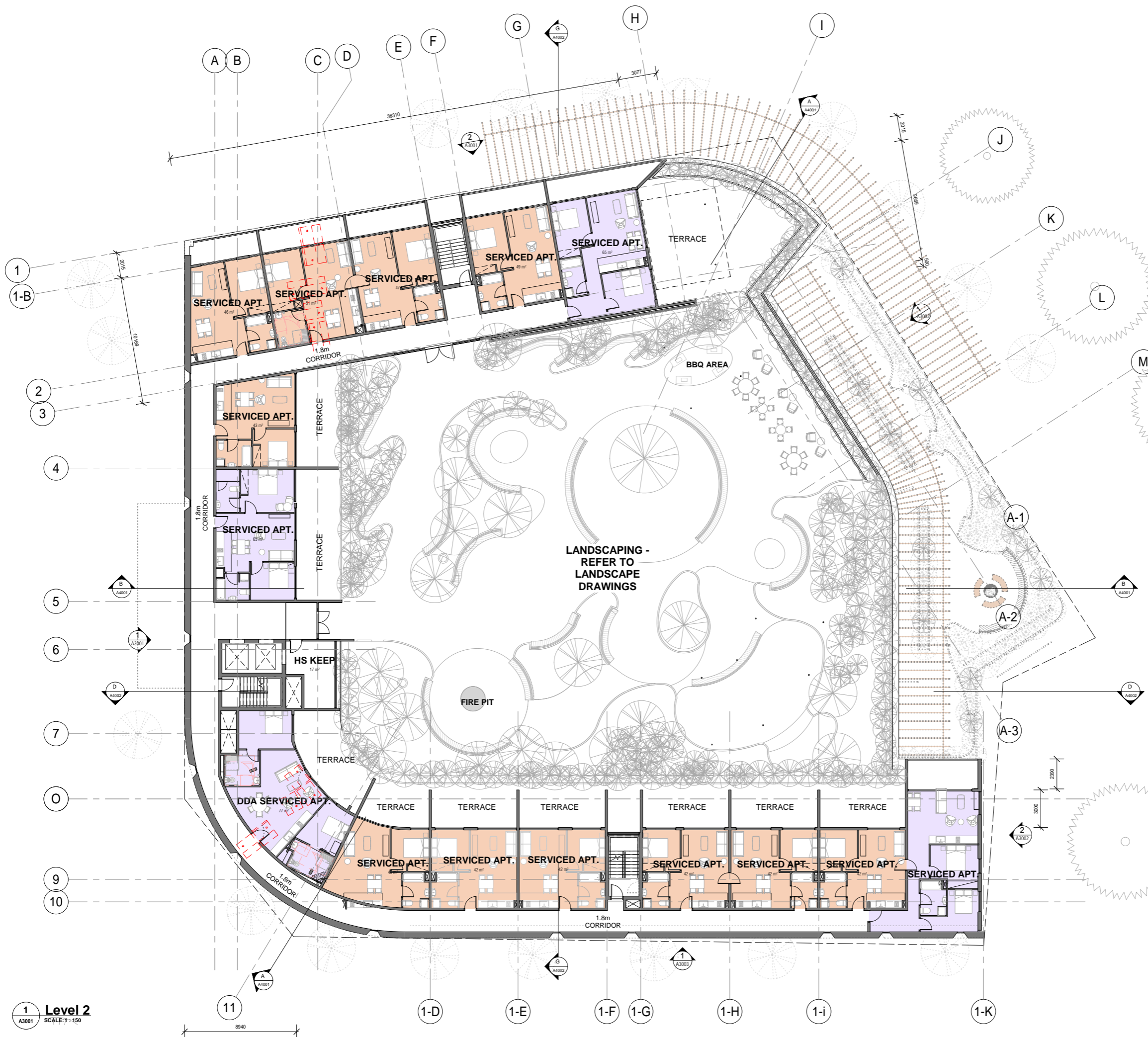
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revision
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MURRAY MEWS
 329 MURRAY ST
 PERTH WA 6000

1 Level 1
 SCALE: 1:150



1 Level 2
A3001 SCALE: 1:150

ROOM SCHEDULE

F+B TENANCY 01	460m ²
RETAIL 01	167m ²
3 BED	121m ²

ROOM SCHEDULE

1 BED	47	71%
2 BED	16	24%
3 BED	3	5%

TOTAL ROOM SCHEDULE

	1 BED	2 BED	3 BED	
LEVEL 01	10	3	1	14
LEVEL 02	11	4	0	15
LEVEL 03	8	4	0	12
LEVEL 04	6	4	0	10
LEVEL 05	4	2	1	7
LEVEL 06	5	1	1	7
LEVEL 07	3	0	1	4
TOTAL				69

PARKING

GROUND FLOOR	36
LEVEL 1	40
TOTAL	76

Revision schedule		

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PRELIMINARY DA

drawing name
LEVEL 2 PLAN

drawing #
21009/ A1005

date
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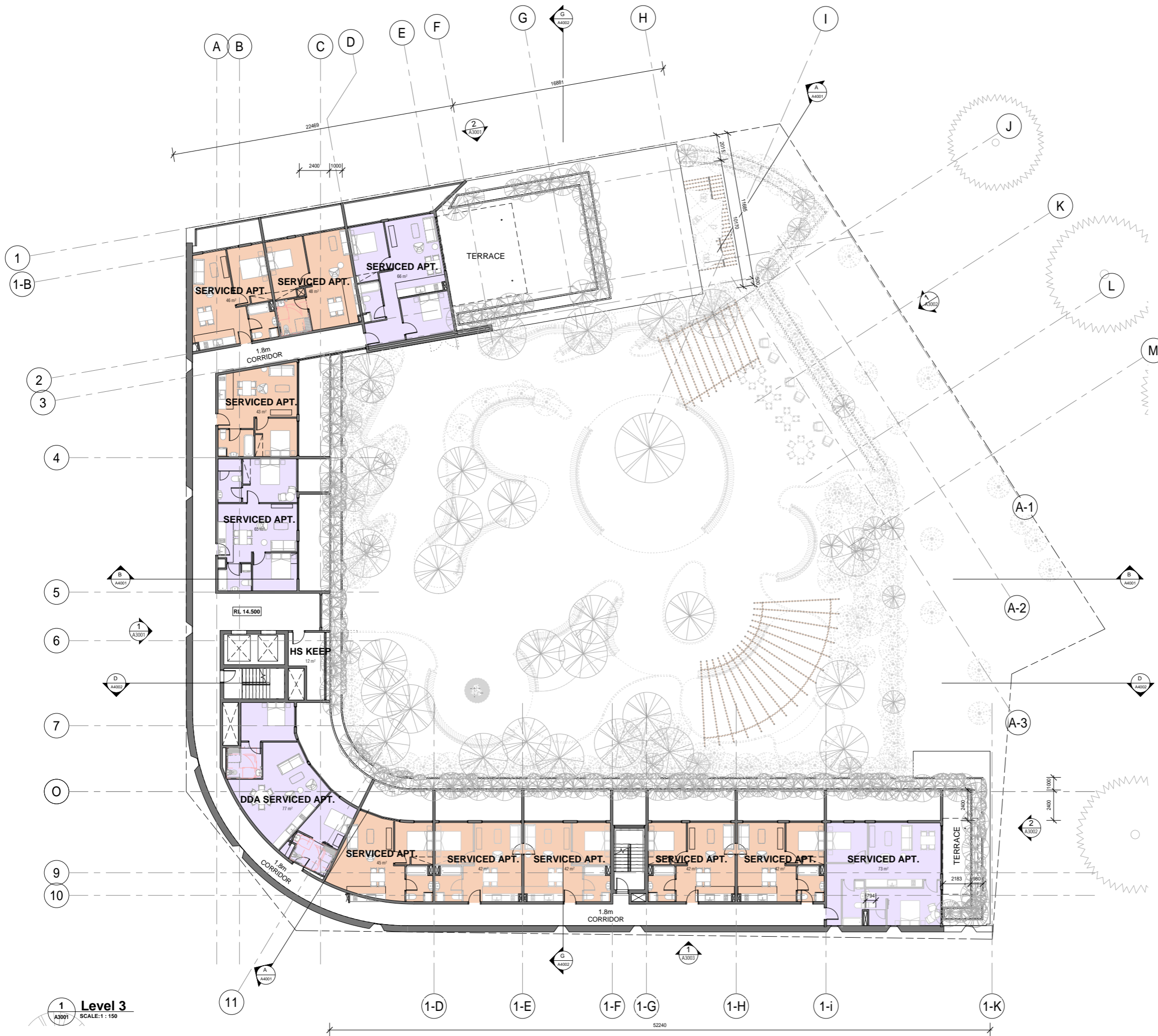
scale
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PRELIMINARY DA

drawing name
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drawing #
21009/ A1006

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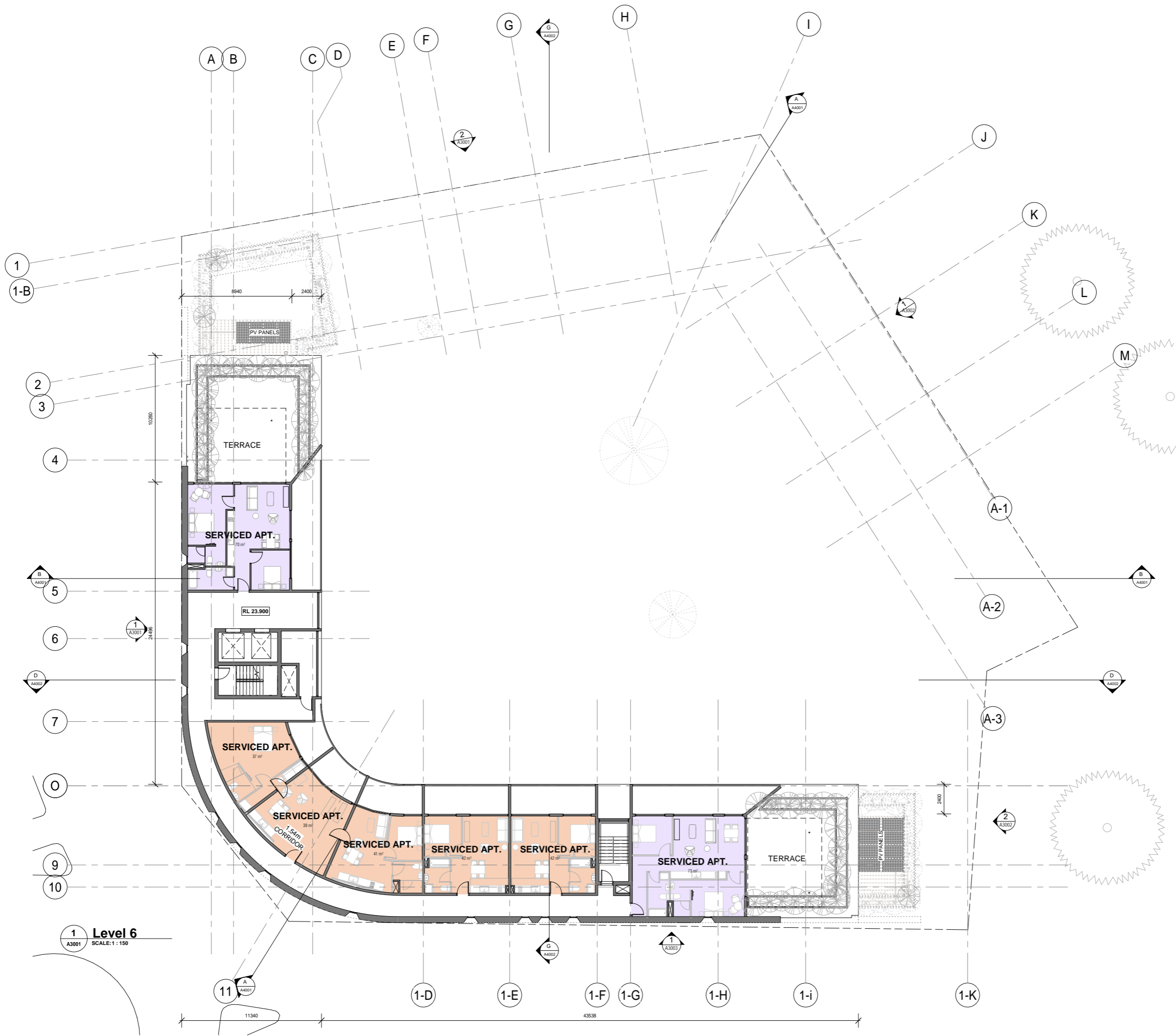
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1 Level 3
 SCALE: 1 : 150



ROOM SCHEDULE

F+B TENANCY 01	460m ²
RETAIL 01	167m ²
3 BED	121m ²

ROOM SCHEDULE

1 BED	47	71%
2 BED	16	24%
3 BED	3	5%

TOTAL ROOM SCHEDULE

	1 BED	2 BED	3 BED	
LEVEL 01	10	3	1	14
LEVEL 02	11	4	0	15
LEVEL 03	8	4	0	12
LEVEL 04	6	4	0	10
LEVEL 05	4	2	1	7
LEVEL 06	5	1	1	7
LEVEL 07	3	0	1	4
TOTAL				69

PARKING

GROUND FLOOR	36
LEVEL 1	40
TOTAL	76

Revision schedule		

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PRELIMINARY DA

drawing name
 LEVEL 6 PLAN

drawing #
21009/ A1009

date
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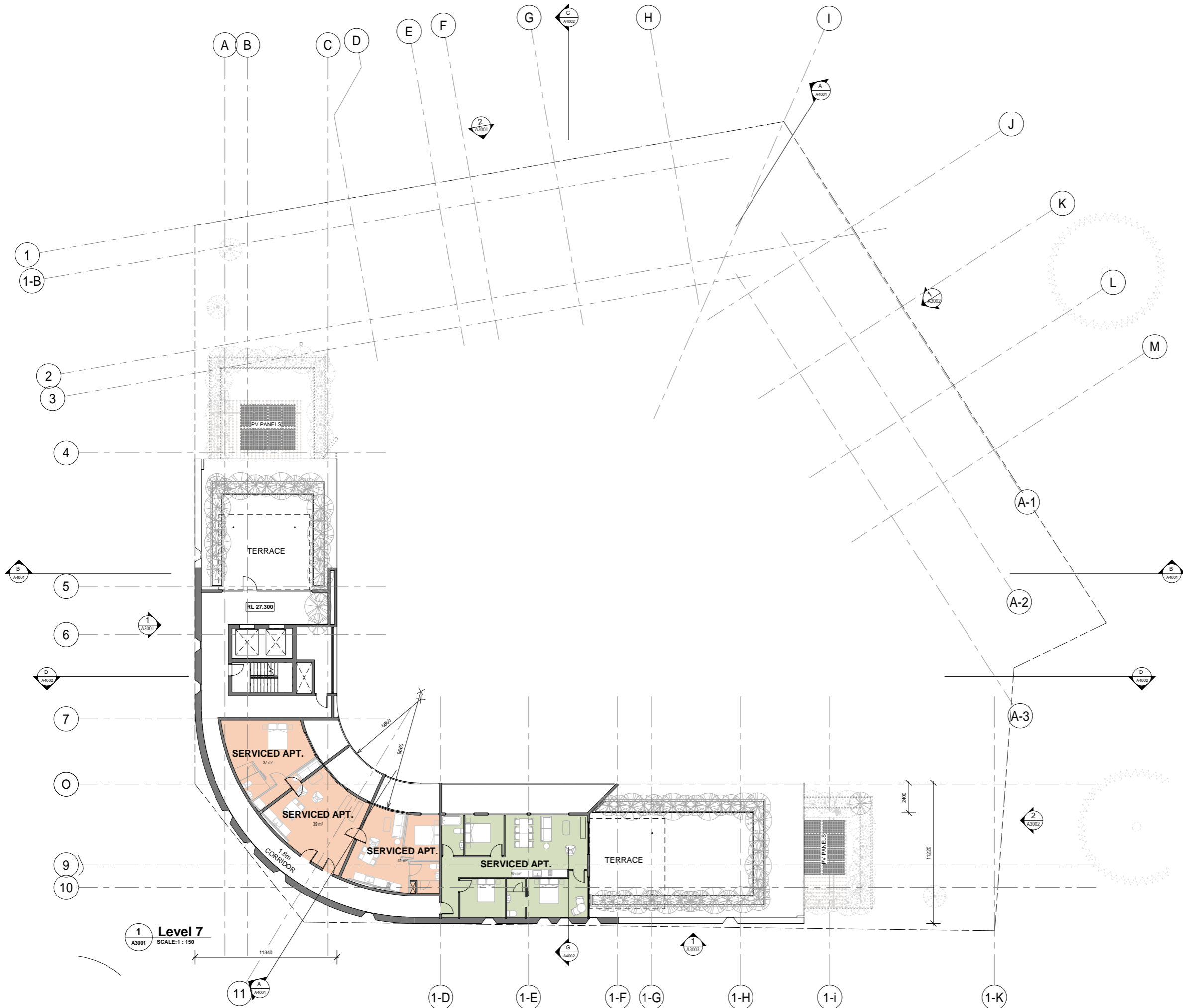
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1 Level 6
 SCALE: 1 : 150



ROOM SCHEDULE

F+B TENANCY 01	460m ²
RETAIL 01	167m ²
3 BED	121m ²

ROOM SCHEDULE

1 BED	47	71%
2 BED	16	24%
3 BED	3	5%

TOTAL ROOM SCHEDULE

	1 BED	2 BED	3 BED	
LEVEL 01	10	3	1	14
LEVEL 02	11	4	0	15
LEVEL 03	8	4	0	12
LEVEL 04	6	4	0	10
LEVEL 05	4	2	1	7
LEVEL 06	5	1	1	7
LEVEL 07	3	0	1	4
TOTAL				69

PARKING

GROUND FLOOR	36
LEVEL 1	40
TOTAL	76

Revision schedule		

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LEVEL 7 PLAN

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21009/ A1010

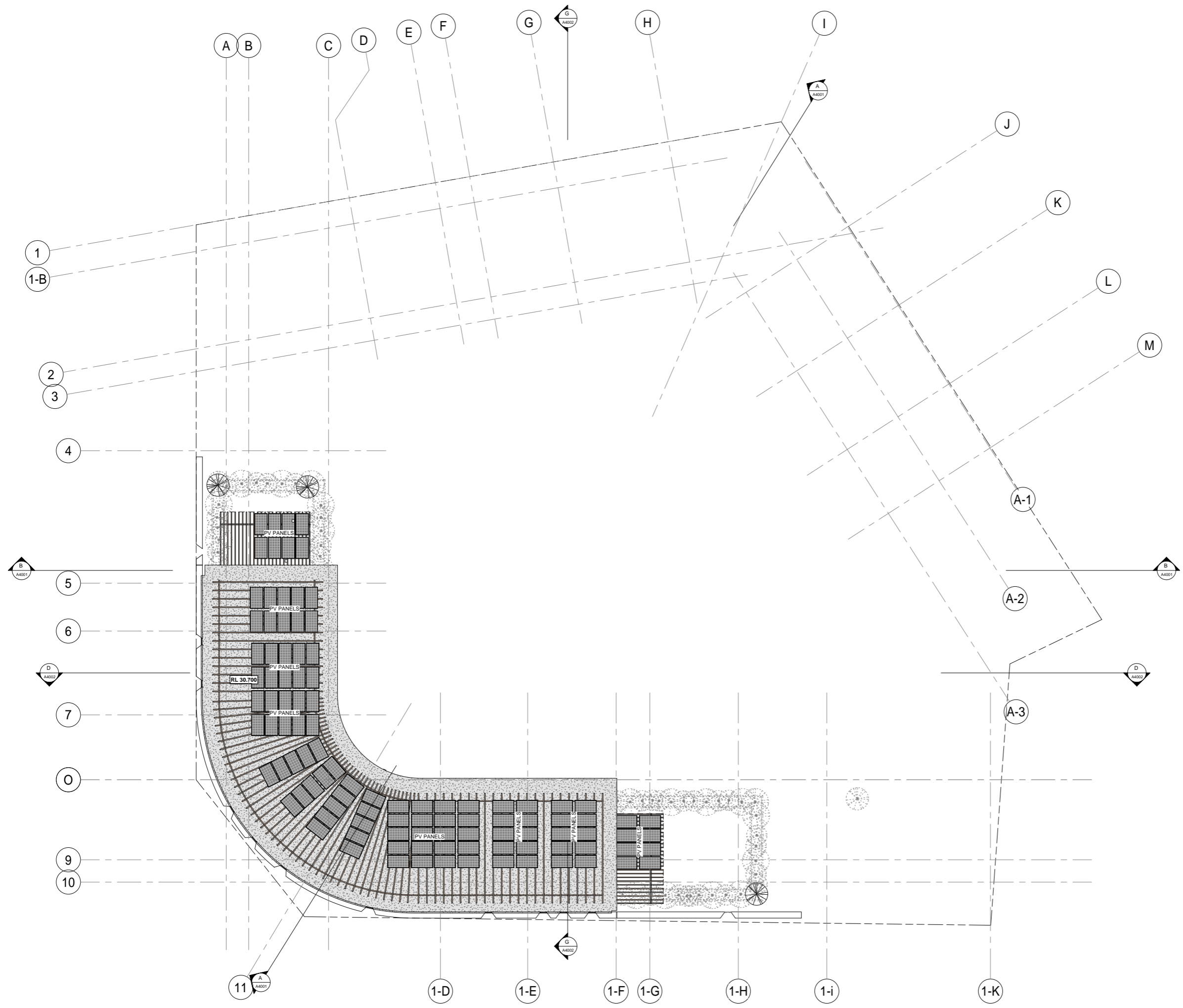
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PRELIMINARY DA

drawing name
 ROOF PLAN

drawing #
21009/ A1011

date
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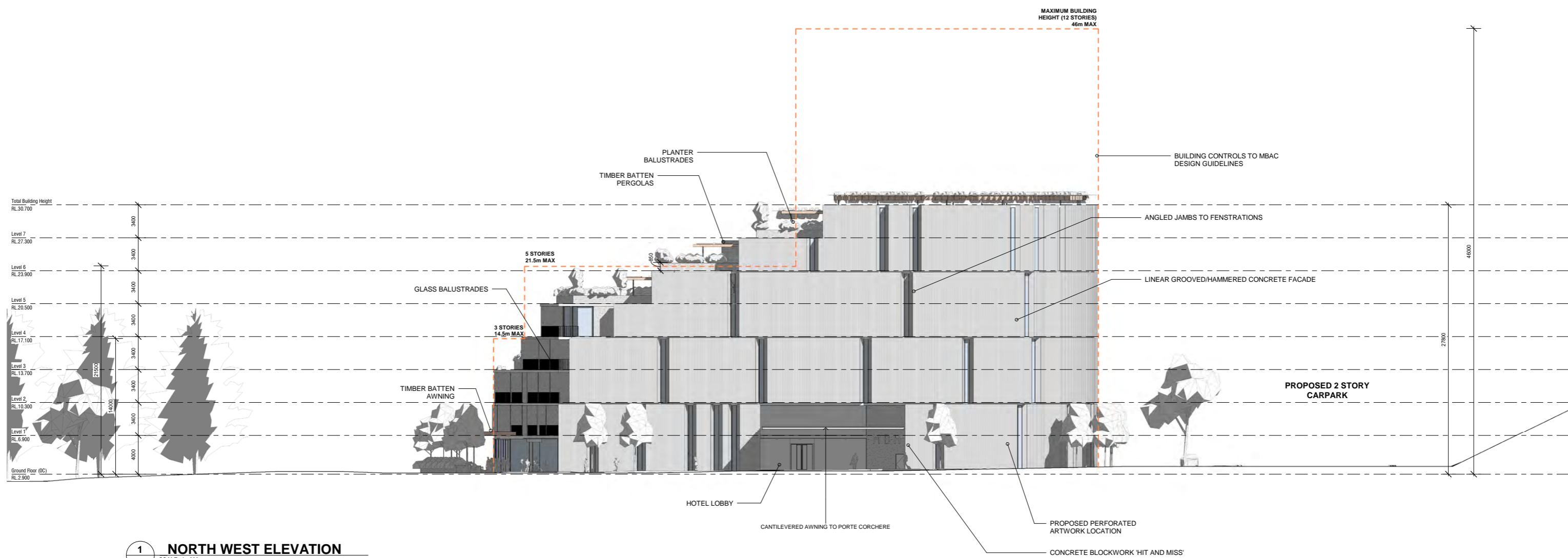
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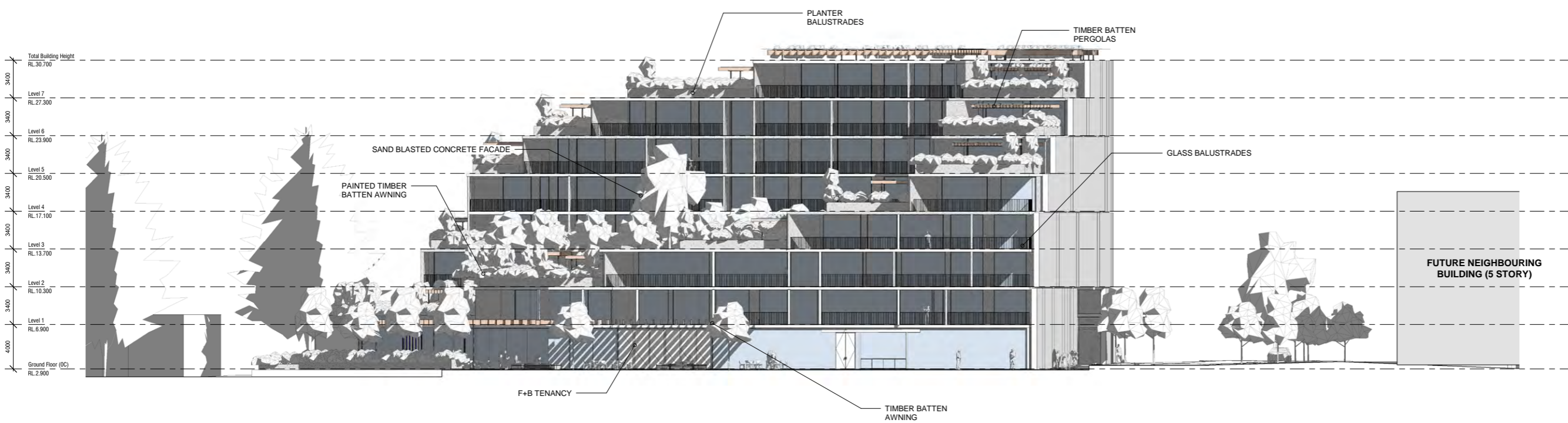
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1 NORTH WEST ELEVATION
SCALE: 1 : 200



2 NORTH ELEVATION
SCALE: 1 : 200

Revision schedule

NO.	REVISION	DATE

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PRELIMINARY DA

drawing name
ELEVATIONS

drawing #
21009/ A3001

date
31/08/2022
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1 : 200@A1

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3D VIEWS

Appendix B – Influencing Factor Calculation

The assigned levels combine a baseline assigned level with an influencing factor, with the latter increasing the assigned level on the basis of the existence of significant roads and commercial or industrial zoned land within an inner circle (100 metre radius) and an outer circle (450 metre radius) of the noise sensitive premises. The calculation for the influencing factor is:

$$= \frac{1}{10} (\% \text{ Type A}_{100} + \% \text{ Type A}_{450}) + \frac{1}{20} (\% \text{ Type B}_{100} + \% \text{ Type B}_{450})$$

where:

% Type A₁₀₀ = the percentage of industrial land within
a 100m radius of the premises receiving the noise

% Type A₄₅₀ = the percentage of industrial land within
a 450m radius of the premises receiving the noise

% Type B₁₀₀ = the percentage of commercial land within
a 100m radius of the premises receiving the noise

% Type B₄₅₀ = the percentage of commercial land within
a 450m radius of the premises receiving the noise

+ Transport Factor (maximum of 6 dB)

= 2 for each secondary road (6,000 to 15,000 vpd) within 100m

= 2 for each major road (> 15,000 vpd) within 450m

= 6 for each major road within 100m

The nearest noise sensitive premises are identified as the future development on the west side of Flinders Parade, also on parent Lot 9001, referred to as R1 and understood to be between 2 and 5 storeys.

Table B-1 shows the percentage of industrial and commercial land within the inner (100 metre radius) and outer (450 metre radius) circles of the noise sensitive premises, with this also shown on **Error! Reference source not found.** for Receiver R1. Note that it is assumed all land zoned Tourist/Residential, for the purpose of the influencing factor calculation, is counted as commercial, being the highest permitted use.

Table B-1: Percentage of Land Types within 100m and 450m Radii

Receiver	Land Type	Within 100m	Within 450m
R1	Type A - Industrial and Utility	0	0
	Type B – Commercial	46	21

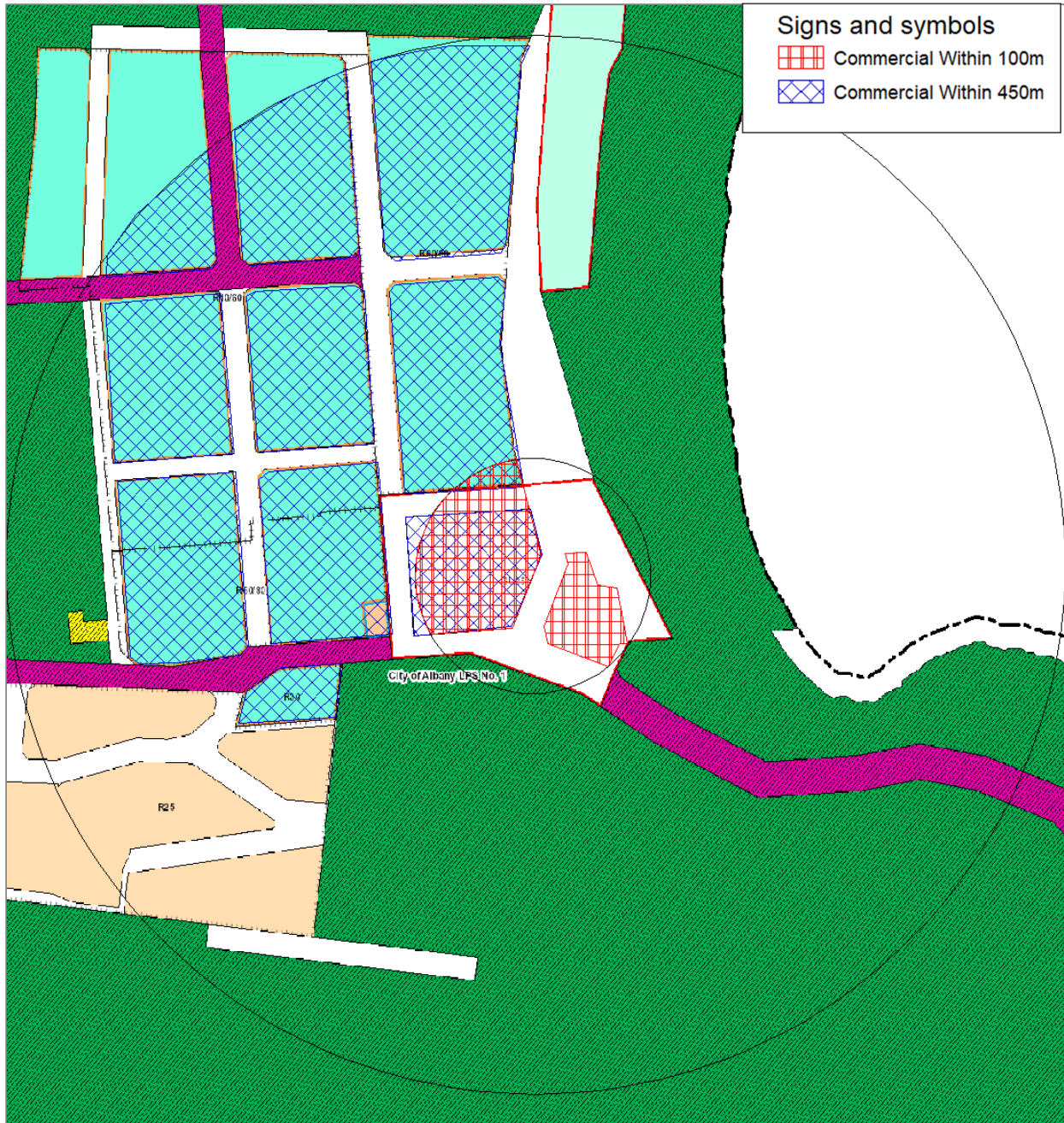


Figure B-1: Land Types within 100m and 450m Radii of R1

From the Main Roads WA Traffic Map, there are no major or secondary roads within 450m and therefore no transport factor is applicable.

Table B-2 combines the percentage land types and Transport Factor to calculate the influencing factor.

Table B-2: Influencing Factor Calculation, dB

Receiver	Industrial Land	Commercial Land	Transport Factor	Total
R1	0.0	3.4	0.0	3

The influencing factor calculated in *Table B-2* is combined with those baseline assigned levels of *Table 2-2*, resulting in the project assigned levels provided in *Table 2-3*.

Appendix C – Terminology

The following is an explanation of the terminology used throughout this report:

- **Decibel (dB)**

The decibel is the unit that describes the sound pressure levels of a noise source. It is a logarithmic scale referenced to the threshold of hearing.

- **A-Weighting**

An A-weighted noise level has been filtered in such a way as to represent the way in which the human ear perceives sound. This weighting reflects the fact that the human ear is not as sensitive to lower frequencies as it is to higher frequencies. An A-weighted sound level is described as L_A , dB.

- **Sound Power Level (L_w)**

Under normal conditions, a given sound source will radiate the same amount of energy, irrespective of its surroundings, being the sound power level. This is similar to a 1kW electric heater always radiating 1kW of heat. The sound power level of a noise source cannot be directly measured using a sound level meter but is calculated based on measured sound pressure level at known distances. Noise modelling incorporates source sound power levels as part of the input data.

- **Sound Pressure Level (L_p)**

The sound pressure level of a noise source is dependent upon its surroundings, being influenced by distance, ground absorption, topography, meteorological conditions etc. and is what the human ear actually hears. Using the electric heater analogy above, the heat will vary depending upon where the heater is located, just as the sound pressure level will vary depending on the surroundings. Noise modelling predicts the sound pressure level from the sound power levels taking into account ground absorption, barrier effects, distance etc.

- **L_{ASlow}**

This is the noise level in decibels, obtained using the A-frequency weighting and the S (slow) time weighting. Unless assessing modulation, all measurements use the slow time weighting characteristic.

- **L_{AFast}**

This is the noise level in decibels, obtained using the A-frequency weighting and the F (fast) time weighting. This is used when assessing the presence of modulation.

- **L_{APeak}**

This is the greatest absolute instantaneous sound pressure level in decibels using the A-frequency weighting.

- **L_{Amax}**

An L_{Amax} level is the maximum A-weighted noise level during a particular measurement.

- **L_{eq}**

The L_{eq} level represents the average noise energy during a measurement period.

- **L₁**

The L₁ level represents the noise level exceeded for 1 percent of the measurement period and is considered to represent the average of the maximum noise levels measured.

- **L₁₀**

The L₁₀ level represents the noise level exceeded for 10 percent of the measurement period and is considered to represent the “intrusive” noise level.

- **L₉₀**

The L₉₀ level represents the noise level exceeded for 90 percent of the measurement period and is considered to represent the “background” noise level.

- **One-Third-Octave Band**

Means a band of frequencies spanning one-third of an octave and having a centre frequency between 25 Hz and 20000 Hz inclusive.

- **Representative Assessment Period**

Means a period of time not less than 15 minutes, and not exceeding four hours, determined by an inspector or authorised person to be appropriate for the assessment of a noise emission, having regard to the type and nature of the noise emission.

- **L_{Amax} assigned level**

Means an assigned level, which, measured as a L_{ASlow} value, is not to be exceeded at any time.

- **L_{A1} assigned level**

Means an assigned level, which, measured as a L_{ASlow} value, is not to be exceeded for more than 1 percent of the representative assessment period.

- **L_{A10} assigned level**

Means an assigned level, which, measured as a L_{ASlow} value, is not to be exceeded for more than 10 percent of the representative assessment period.

- **Major Road**

Is a road with an estimated average daily traffic count of more than 15,000 vehicles.

- **Secondary / Minor Road**

Is a road with an estimated average daily traffic count of between 6,000 and 15,000 vehicles.

- **Tonal Noise**

A tonal noise source can be described as a source that has a distinctive noise emission in one or more frequencies. An example would be whining or droning. The quantitative definition of tonality is:

- the presence in the noise emission of tonal characteristics where the difference between -
 - (a) the A-weighted sound pressure level in any one-third octave band; and
 - (b) the arithmetic average of the A-weighted sound pressure levels in the 2 adjacent one-third octave bands,

is greater than 3 dB when the sound pressure levels are determined as $L_{Aeq,T}$ levels where the time period T is greater than 10% of the representative assessment period, or greater than 8 dB at any time when the sound pressure levels are determined as $L_{A,slow}$ levels.

This is relatively common in most noise sources.

- **Modulating Noise**

A modulating source is regular, cyclic and audible and is present for at least 10% of the measurement period. The quantitative definition of modulation is:

- a variation in the emission of noise that —
 - (a) is more than 3 dB $L_{A,fast}$ or is more than 3 dB $L_{A,fast}$ in any one-third octave band; and
 - (b) is present for at least 10% of the representative assessment period; and
 - (c) is regular, cyclic and audible.

- **Impulsive Noise**

An impulsive noise source has a short-term banging, clunking or explosive sound. The quantitative definition of impulsiveness means:

- a variation in the emission of a noise where the difference between L_{Apeak} and L_{Amax} is more than 15 dB when determined for a single representative event.

- **R_w**

This is the weighted sound reduction index. It is a single number rating determined by moving a grading curve in integral steps against the laboratory measured transmission loss until the sum of the deficiencies at each one-third-octave band, between 100 Hz and 3.15 kHz, does not exceed 32 dB. The higher the R_w value, the better the acoustic performance.

- **C_{tr}**

This is a spectrum adaptation term for airborne noise and provides a correction to the R_w value to suit source sounds with significant low frequency content such as road traffic or home theatre systems. A wall that provides a relatively high level of low frequency attenuation (i.e. masonry) may have a value in the order of – 4 dB, whilst a wall with relatively poor attenuation at low frequencies (i.e. stud wall) may have a value in the order of -12 dB.

- **$L'_{n,w}$**

This is the weighted normalised impact sound pressure level, which is determined by measuring the sound pressure level in the receiving room in one-third-octave bands between 100 Hz and 3.15 kHz and moving a grading curve in integral steps, such that the curve is as high as possible without the sum of deficiencies exceeding 32 dB. The normalisation is to a receiving room sound absorption area of 10m². The lower the $L'_{n,w}$ value the better the acoustic performance.

- **Assessment Method**

Means a method used for determining that a Building Solution complies with the Performance Requirements.

- **Verification Method**

Means a test, inspection, calculation or other method that determines whether a performance solution complies with the relevant performance requirements.

- **Performance Solution**

Means a method of complying with the performance requirements other than by a deemed to satisfy solution.

- **Deemed to Satisfy Provisions**

Means provisions which are deemed to satisfy the Performance Requirements.

- **Deemed to Satisfy Solution**

Means a method of satisfying the deemed to satisfy provisions.

- **Expert Judgement**

Means the judgement of an expert who has the qualifications and experience to determine whether a Performance Solution or Deemed to Satisfy Solution complies with the Performance Requirements.

- **Habitable Room**

Means a room used for normal domestic activities, and

- includes a bedroom, living room, lounge room, music room, television room, kitchen, dining room, sewing room, study, playroom, family room, home theatre and sunroom; but
- excludes a bathroom, laundry, water closet, pantry, walk-in wardrobe, corridor, hallway, lobby, photographic darkroom, clothes-drying room, and other spaces of a specialised nature occupied neither frequently nor for extended periods.

- **Public Corridor**

Means an enclosed corridor, hallway or the like which –

- Serves as a means of egress from 2 or more sole-occupancy units to a required exit from the storey concerned; or
- Is required to be provided as a means of egress from any part of a storey to a required exit.

- **Performance Requirement**

Means a requirement which states the level of performance which a Performance Solution or deemed to satisfy solution must meet.

- **Sole Occupancy Unit**

Means a room or other part of a building for occupation by one or joint owner, lessee, tenant, or other occupier to the exclusion of any other owner, lessee, tenant, or other occupier and includes –

- a) a dwelling; or
- b) a room or suite of rooms in a Class 3 building which includes sleeping facilities; or
- c) a room or suite of associated rooms in a Class 5, 6, 7, 8 or 9 building; or
- d) a room or suite of associated rooms in a Class 9c aged care building, which includes sleeping facilities and any area for the exclusive use of a resident.

- **Class 2 Building**

A building containing 2 or more sole occupancy units each being a separate dwelling.

- **Class 3**

A residential building, providing long term or transient accommodation for a number of unrelated persons, including –

- a) a boarding house, guest house, hostel, lodging house or backpacker accommodation.
- b) a residential part of a hotel or motel.
- c) a residential part of a school.
- d) accommodation for the aged, children or people with disability.
- e) a residential part of a health-care building which accommodates members of staff.
- f) a residential part of a detention centre
- g) a residential care building.

- **$L_{Aeq(Day)}$**

The $L_{Aeq(Day)}$ level is the logarithmic average of the L_{Aeq} levels from 6.00am to 10.00pm.

- **$L_{Aeq(Night)}$**

The $L_{Aeq(Night)}$ level is the logarithmic average of the L_{Aeq} levels from 10.00pm to 6.00am.

- **$L_{A10,18hour}$**

The $L_{A10,18hour}$ level is the arithmetic average of the hourly L_{A10} levels between 6.00am and midnight.

- **$L_{Aeq,24hour}$**

The $L_{Aeq,24hour}$ level is the logarithmic average of the L_{Aeq} levels from over an entire day.

- **Noise-sensitive land use and/or development**

Land-uses or development occupied or designed for occupation or use for residential purposes (including dwellings, residential buildings or short-stay accommodation), caravan park, camping ground, educational establishment, child care premises, hospital, nursing home, corrective institution or place of worship.

- **About the Term 'Reasonable'**

An assessment of reasonableness should demonstrate that efforts have been made to resolve conflicts without comprising on the need to protect noise-sensitive land-use activities. For example, have reasonable efforts been made to design, relocate or vegetate a proposed noise barrier to address community concerns about the noise barrier height? Whether a noise mitigation measure is reasonable might include consideration of:

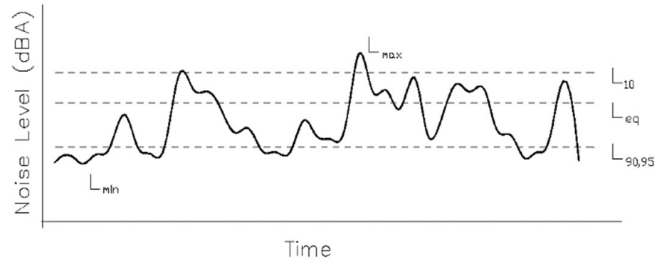
- The noise reduction benefit provided;
- The number of people protected;
- The relative cost vs benefit of mitigation;
- Road conditions (speed and road surface) significantly differ from noise forecast table assumptions;
- Existing and future noise levels, including changes in noise levels;
- Aesthetic amenity and visual impacts;
- Compatibility with other planning policies;
- Differences between metropolitan and regional situations and whether noise modelling requirements reflect the true nature of transport movements;
- Ability and cost for mobilisation and retrieval of noise monitoring equipment in regional areas;
- Differences between Greenfield and infill development;
- Differences between freight routes and public transport routes and urban corridors;
- The impact on the operational capacity of freight routes;
- The benefits arising from the proposed development;
- Existing or planned strategies to mitigate the noise at source.

- **About the Term 'Practicable'**

'Practicable' considerations for the purposes of the policy normally relate to the engineering aspects of the noise mitigation measures under evaluation. It is defined as "reasonably practicable having regard to, among other things, local conditions and circumstances (including costs) and to the current state of technical knowledge" (*Environmental Protection Act 1986*). These may include:

- Limitations of the different mitigation measures to reduce transport noise;
- Competing planning policies and strategies;
- Safety issues (such as impact on crash zones or restrictions on road vision);
- Topography and site constraints (such as space limitations);
- Engineering and drainage requirements;
- Access requirements (for driveways, pedestrian access and the like);
- Maintenance requirements;
- Bushfire resistance or BAL ratings;
- Suitability of the building for acoustic treatments.

- **Chart of Noise Level Descriptors**



- **Austrroads Vehicle Class**

VEHICLE CLASSIFICATION SYSTEM	
AUSTRROADS	
CLASS 1	LIGHT VEHICLES MOTOR CYCLES, MOTOR AND TRAILER MOTORCYCLES
CLASS 2	HEAVY TRUCKS TRUCKS EXCEPT HEAVY TRUCKS
CLASS 3	HEAVY TRUCKS HEAVY TRUCKS OR BUS
CLASS 4	HEAVY TRUCKS HEAVY TRUCKS OR BUS
CLASS 5	HEAVY TRUCKS HEAVY TRUCKS OR BUS
CLASS 6	HEAVY TRUCKS HEAVY TRUCKS OR BUS
CLASS 7	HEAVY TRUCKS HEAVY TRUCKS OR BUS
CLASS 8	HEAVY TRUCKS HEAVY TRUCKS OR BUS
CLASS 9	HEAVY TRUCKS HEAVY TRUCKS OR BUS
CLASS 10	HEAVY TRUCKS HEAVY TRUCKS OR BUS
CLASS 11	HEAVY TRUCKS HEAVY TRUCKS OR BUS
CLASS 12	HEAVY TRUCKS HEAVY TRUCKS OR BUS

- **Typical Noise Levels**

