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Environmental Noise Assessment

Proposed Restaurant/Café at Depena Reserve
179 - 183 Russell Avenue, Dolls Point, NSW

REPORT NUMBER
6993-2.1R

DATE ISSUED
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Prepared For:
Sam Crawford Architects
Level 2, 17 Federation Road
Newtown NSW 2042

Attention: Mr Benjamin Chan

Revision History

Status	Date	Prepared	Checked	Comment
Final	31/10/2023	William Wang	Stephen Gauld	

Document 6993-2.1R, 21 pages plus attachments

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1.0 CONSULTING BRIEF

Day Design Pty Ltd has been engaged by Sam Crawford Architects to assess the potential environmental noise impact of a proposed restaurant/café at Depena Reserve, 179-183 Russell Avenue, Dolls Point, NSW.

This commission involves the following:

Scope of Work:

- Inspect the site and environs
- Prepare a site plan identifying the development and nearby noise sensitive locations
- Measure the background noise levels at critical locations and times
- Establish acceptable noise emission criteria
- Quantify noise emissions from the potential restaurant/café
- Calculate the level of noise emission, taking into account building envelope transmission loss, screen walls and distance attenuation
- Provide recommendations for noise control
- Prepare an Environmental Noise Assessment Report.

2.0 PROJECT & DEVELOPMENT DESCRIPTION

2.1 Local Area Description

An existing building containing a café and restaurant is proposed to be redeveloped at Depena Reserve, 179-183 Russell Avenue, Dolls Point, NSW, on land zoned 'RE1 –Public Recreation, under Rockdale Local Environmental Plan (LEP) 2011.

The nearest noise sensitive residential receivers are the residential apartments located across Malua Street and Russell Avenue to the north. The Scots College Brighton Preparatory is located to the east, with Depena Reserve to the west and south.

The location of the proposed development and surrounding premises, in various directions, are shown in Figure 1 and summarised in Table 1.

Table 1 Noise Sensitive Receptors

Receptor and Type	Address	Direction from site
R1 – Residential	188 Russell Avenue	North
R2 – Educational Establishment	190 Russell Avenue	East
R3 – Active Recreation Area	Depena Reserve	West

2.2 Development Description

The restaurant/cafe is proposed to be located on the reserve of Depena Reserve. The restaurants will include an indoor dining area, outdoor dining area, kitchens and back of house area, with a capacity of up to 300 patrons. The restaurant will be licensed to serve alcohol.

Mechanical plant including, but not limited to, air conditioning condenser units, cool room compressor and kitchen exhaust fan will likely be required to serve the restaurant.

The proposed trading hours are as follows:

- Monday – Sunday: 6.00 am to 10.00 pm.

Figure 1. Location Plan – Proposed Restaurant/Café, Depena Reserve, Dolls Point, NSW.

3.0 ACOUSTICAL CRITERIA

Bayside Council requires a noise assessment of the expected future noise levels from the restaurant/café to ensure the noise emission from the site is acceptable at the nearby noise sensitive receivers.

There are several noise criteria that are potentially applicable to this proposal. We have presented and established the project specific noise criteria in Section 3.4.

3.1 Measured Background Noise Levels

In order to assess the severity of a possible environmental noise problem in a specified area it is necessary to measure the ambient background noise level at the times and locations of worst possible annoyance. The lower the background noise level, the more perceptible the intrusive noise becomes and the more potentially annoying.

The ambient L_{90} background noise level is a statistical measure of the sound pressure level that is exceeded for 90% of the measuring period (typically 15 minutes).

The Rating Background Level (RBL) is defined by the EPA as the median value of the (lower) tenth percentile of L_{90} ambient background noise levels for day, evening or night periods, measured over a number of days during the proposed days and times of operation.

The places of worst possible annoyance are the existing residential premises located across Malua Street to the north. There is an educational establishment to the east, with the reserve to the south and west. The potentially affected residential locations are shown in Figure 1 as 'R1'.

An environmental noise logger was placed on the balcony of a nearby residential apartment facing the site. The noise monitor was in place from Monday 22 June to Wednesday 29 June 2020 to determine the Rating Background Level. This location is shown as Location 'A' on Figure 1.

Noise survey instrumentation used in this assessment is listed in **Appendix A.** The measured noise levels are presented in the attached **Appendix B** and also in Table 2.

Table 2 Measured Ambient Noise Levels

Noise Measurement Location	Time Period	Rating L_{90} Background Level (dBA)	Existing L_{eq} Level (dBA)
Location 'A' 2/27 Malua Street, Dolls Point (Balcony)	Early Morning (6 am to 7 am)	**44**	**-**
	Day (7 am to 6 pm)	**44**	**61**
	Evening (6 pm to 10 pm)	**40**	**56**
	Night (12 am to 7 am)	**36**	**52**

Meteorological conditions during the testing typically consisted of clear and cloudy skies and temperatures of 18 to 26°C. Atmospheric conditions were considered ideal for noise monitoring and were therefore considered reliable and typical for the receptor area.

A short term, 15 minute background noise level measurement in octave bands was carried out at Attended Measurement Location 1 on Russell Avenue on Monday 6 July 2020 at approximately 8.30 pm to establish acceptable noise criteria limits for assessment against the Liquor and Gaming NSW noise criterion. The measured octave band spectra is shown in Table 3.

Table 3 Octave Band L_{90} Background Noise Level

Description	dBA	Sound Pressure Levels (dB) at Octave Band Centre Frequencies (Hz)								
		32	63	125	250	500	1k	2k	4k	8k
Background Noise Level – Dolls Point	**38**	51	51	46	38	35	34	27	19	13

3.2 NSW Noise Policy for Industry

3.2.1 Intrusiveness Criteria

The EPA states in Section 2.3 of its NSW *NPI* (October 2017) that the intrusiveness of an industrial noise source may generally be considered acceptable if the level of noise from the source (represented by the L_{Aeq} descriptor), measured over a 15-minute period, does not exceed the rating background noise level by more than 5 dB when beyond a minimum threshold (EPA *NPI*, 2017, Section 2.3).

The RBLs at Location 'A' are shown in Table 2. Therefore the acceptable L_{eq} intrusiveness criteria for residential receptors in this areas is as shown in Table 4.

Table 4 Project Specific Intrusiveness Criteria

Noise Measurement Location	Time Period	Rating L_{90} Background Level (dBA)	Intrusiveness Criteria (dBA)
Residences Facing Malua Street/ Russell Avenue	Early Morning (6 am to 7 am)	44	(44 + 5 =) **49**
	Day (7 am to 6 pm)	44	(44 + 5 =) **49**
	Evening (6 pm to 10 pm)	40	(40 + 5 =) **45**
	Night (12 am to 7 am)	36	(36 + 5 =) **41**

3.2.2 Amenity Criteria

Depending on the type of area in which the noise is being made, there is a certain reasonable expectancy for noise amenity. The NSW *Noise Policy for Industry* provides a schedule of recommended L_{eq} industrial noise levels that under normal circumstances should not be exceeded. If successive developments occur near a residential area, each one allowing a criterion of background noise level plus 5 dB, the ambient noise level will gradually creep higher.

The recommended L_{eq} noise levels below in Table 5 are taken from Section 2.4, Table 2.2 of the NPI.

Table 5 Amenity Criteria

Receiver	Noise Amenity Area	Time of Day	Recommended L_{eq}, dBA Amenity Noise Level
Residential	Suburban	Day	55
		Evening	45
		Night	40
Active recreation area (eg school playground, golf course)	All	When in use	55
School Classroom – internal	All	Noisiest 1-hour period when in use	35

We have applied a 10 dB correction for changing the criteria from internal to external for school classrooms.

The L_{Aeq} is determined over a 15-minute period for the project intrusiveness noise level and over an assessment period (day, evening and night) for the project amenity noise level. This leads to the situation where, because of the different averaging periods, the same numerical value does not necessarily represent the same amount of noise heard by a person for different time periods. To standardise the time periods for the intrusiveness and amenity noise levels, the *NPI* assumes that the **$L_{Aeq,15min}$** will be taken to be equal to the **$L_{Aeq, period}$ + 3 decibels (dB)**.

Compliance with the amenity criteria will limit ambient noise creep. Wherever the existing L_{eq} noise level from industrial noise sources approaches or exceeds the amenity criteria at a critical receptor location, the intrusive L_{eq} noise from the noise source in question must be reduced to a level that may be as much as 10 dB below the existing L_{eq} industrial noise level.

In addition, the level of transport noise, road traffic noise in particular, may be high enough to make noise from an industrial source effectively inaudible, even though the L_{Aeq} noise level from that industrial noise source may exceed the project amenity noise level. In such cases the project amenity noise level may be derived from the $L_{Aeq, period (traffic)}$ minus 15 dBA.

The existing L_{eq} noise levels at Location 'A' and Location 'B' are shown in Table 2.

Therefore, the acceptable L_{eq} amenity criteria for the residential and commercial receptors in this area are as shown in Table 6.

Table 6 Project Specific Amenity Criteria

Noise Measurement Location	Time Period	Existing L_{eq} Level (dBA)	Amenity Criteria (dBA)
Residences Facing Malua Street/ Russell Avenue	Day (7 am to 6 pm)	61	(55 – 5 + 3 =) **53**
	Evening (6 pm to 10 pm)	56	(56 - 10 + 3=) **49**
	Night (12 am to 7 am)	52	(52 - 10 + 3=) **45**
Active Recreation	When in use	-	(55 – 5 + 3 =) **53**
School Classroom – external	Noisiest 1-hour period when in use	-	(35 + 10 – 5 + 3 =) **53**

3.3 NSW Liquor & Gaming Noise Criteria for Licensed Premises

In addition to the NSW Noise Policy for Industry outlined above, NSW Liquor and Gaming requires the following in relation to noise emission from music and patrons associated with licensed premises:

- *"The L_{A10} noise level emitted from the licensed premises shall not exceed the background noise level in any Octave Band Centre Frequency (31.5 Hz – 8 kHz inclusive) by more than 5 dB between 07:00 am and 12:00 midnight at the boundary of any affected residence.*
- *The L_{A10} noise level emitted from the licensed premises shall not exceed the background noise level in any Octave Band Centre Frequency (31.5 Hz – 8 kHz inclusive) between 12:00 midnight and 07:00 am at the boundary of any affected residence.*
- *Notwithstanding compliance with the above, the noise from the licensed premises shall not be audible within any habitable room in any residential premises between the hours of 12:00 midnight and 07:00 am".*

3.4 Project Specific Noise Criteria

3.4.1 Residential Receivers

Based on our measurements of ambient background noise, the acceptable L_{10} level of noise from patrons and music is shown in Table 7.

Table 7 L_{10} Noise Level Criteria – Patron and Music Noise

Description	dBA	Sound Pressure Levels (dB) at Octave Band Centre Frequencies (Hz)								
		32	63	125	250	500	1k	2k	4k	8k
Early Morning and Day (6 am to 6 pm)										
Residences Facing Malua Street/ Russell Avenue	**49**	62	62	57	49	46	45	38	32	24
Evening (6 pm to 10 pm)										
Residences Facing Malua Street/ Russell Avenue	**45**	58	58	53	45	42	41	34	26	20

For mechanical plant noise we find the most stringent criteria to be the following:

Table 8 Mechanical Plant Project Specific Criteria

Noise Measurement Location	Time Period	Project Specific Noise Criteria (dBA)
Residences Facing Malua Street/ Russell Avenue	Early Morning (6 am to 7 am)	**49**
	Day (7 am to 6 pm)	**49**
	Evening (6 pm to 10 pm)	**45**
	Night (10 pm to 7 am)	**41**

These criteria are to be applied at the most-affected point on or within the residential property boundary. For upper floors, the noise is assessed outside the nearest window.

3.4.2 School Classroom Receivers

This criterion is to be assessed at the most affected point outside a school classroom 'R2'.

- **43 dBA** $L_{eq,\ 15\ minute}$ when in use.

3.4.3 Active Recreation Receivers

This criterion is to be assessed at the most affected point on or within the property boundary 'R3'.

- **53 dBA** $L_{eq,\ 15\ minute}$ when in use.

4.0 RESTAURANT NOISE EMISSION

The restaurant/café is proposed to include areas that have the potential to create a noise impact as follows:

- Background music at all times;
- 180 Patrons dining within the restaurant;
- 40 Patrons dining in the front courtyard area;
- 80 Patrons at the rear outdoor area;
- Patrons entering and leaving the restaurant; and
- Mechanical plant.

The noise impact from the restaurant and mechanical plant has been calculated and the cumulative noise impact established for the most affected residential and commercial receptors.

4.1 Restaurants

We have been informed that the capacity of the restaurant/café will be 300 patrons.

We have assumed that the restaurant will operate at full capacity and that the external doors may be open at any time.

We have modelled the noise emission from each restaurant as people talking with a raised voice (20%), normal voice (30%) and the rest not talking, or listening (50%).

Based on information in Harris[1] and in our noise level database gathered over many years, we calculate the sound power levels for people talking as shown in Table 9.

Table 9 L_{10} Sound Power Levels – Restaurant

Description	Sound Power Levels (dB) at Octave Band Centre Frequencies (Hz)									
	dBA	**32.5**	**63**	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**
One man talking with normal voice	**66**	54	57	57	63	66	59	55	51	46
One man talking with raised voice	**72**	58	61	61	67	72	67	63	58	47
Background Music	**82**	72	72	86	78	80	76	74	70	65
300 people (20% raised & 30% normal)	**92**	79	81	87	87	91	86	82	78	71

[1] *Handbook of Acoustical Measurements and Noise Control, Third Edition, Cyril M. Harris, McGraw-Hill Inc, New York, (Page 16.2*

4.2 Mechanical Plant

We have been provided with preliminary drawings for the mechanical plant, including air conditioning condenser units, cool room condenser, toilet exhaust fan, bin room exhaust fan and kitchen exhaust fan from the mechanical engineers, Jones Nicholson. A rooftop plant deck is proposed for all the condensers, with the ventilation fans to be roof mounted.

A schedule of the sound power levels for the preliminary mechanical plant are shown below in Table 10.

Table 10 $L_{eq,\ 15\ minute}$ Sound Power Levels - Mechanical Plant

Description	Sound Power Levels (dB) at Octave Band Centre Frequencies (Hz)								
	dBA	**63**	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**
Typical Commercial A/C Unit (CU-1 to 2)	**80**	57	63	68	74	76	73	69	65
Cool Room Condenser	**76**	81	75	76	74	71	66	61	53
Kitchen Exhaust Fan	**76**	71	81	78	74	69	67	62	61
Bin Room Exhaust Fan	**71**	72	75	75	70	62	59	56	45
Toilet Exhaust Fan	**64**	52	53	59	59	59	58	51	44

We recommend a detailed analysis be carried out once the mechanical plant is selected and locations are finalised, prior to the issue of a Construction Certificate.

4.3 Predicted Noise Levels

Knowing the sound power level of a noise source (Table 9 to Table 10), the sound pressure level (as measured with a sound level meter) can be calculated at a remote location using suitable formulae to account for distance losses and sound barriers.

The limiting factor is the internal to internal noise transmission criteria from the restaurants to the residential apartments across Russell Avenue.

4.3.1 Noise Levels –Music and Patrons – Residential Receivers (Daytime)

The predicted cumulative L_{10} octave band sound pressure levels and overall 'A' frequency weighted sound pressure levels from background music, patrons dining inside the restaurant, and patrons entering and leaving the restaurant at the nearest affected premises during the day time period is shown in Table 11.

Table 11 Cumulative L_{10} Noise Levels – Residential Receivers (6 am – 6 pm)

Description	dBA	Sound Pressure Levels (dB) at Octave Band Centre Frequencies (Hz)								
		32	63	125	250	500	1k	2k	4k	8k
Predicted Noise Level R1 – Residences Across Russell Avenue										
Patrons Outside (Courtyard Doors Open)	**44**	30	33	34	40	44	39	35	29	21
Patrons Inside	**37**	35	37	38	37	41	36	32	26	18
Cumulative Level	**45**	38	41	42	41	45	40	36	30	21
Acceptable Noise Limit (6 am to 6 pm)	**49**	62	62	57	49	46	45	38	32	24
Compliance	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

The predicted cumulative L_{10} levels of noise from background music inside the restaurant, patrons dining, entering and leaving the restaurant at the residential receivers are within the daytime noise criteria established in Section 3.4 and is therefore acceptable.

4.3.2 Noise Levels –Music and Patrons – Residential Receivers (Evening)

After 6 pm, the central courtyard is to be limited to 12 patrons only. The predicted cumulative L_{10} octave band sound pressure levels and overall 'A' frequency weighted sound pressure levels from background music, patrons dining inside the restaurant, 12 patrons in the central courtyard and patrons entering and leaving the restaurant at the nearest affected premises during the evening period is shown in Table 12.

Table 12 Cumulative L_{10} Noise Levels – Residential Receivers (6 pm – 10 pm)

Description	dBA	Sound Pressure Levels (dB) at Octave Band Centre Frequencies (Hz)								
		32	63	125	250	500	1k	2k	4k	8k
Predicted Noise Level R1 – Residences Across Russell Avenue										
Patrons Outside (Courtyard Doors Open)	**39**	26	29	30	35	39	33	29	24	15
Patrons Inside	**37**	33	36	37	31	36	32	28	23	14
Cumulative Level	**41**	32	37	38	37	41	36	32	26	18
Acceptable Noise Limit (6 pm to 10 pm)	**45**	58	58	53	45	42	41	34	26	20
Compliance	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

The predicted cumulative L_{10} levels of noise from background music inside the restaurant, patrons dining, entering and leaving the restaurant at the residential receivers are within the evening noise criteria established in Section 3.4 and is therefore acceptable.

4.3.3 Cumulative Noise Levels – Music and Patrons – Other Receivers

The predicted cumulative L_{Aeq} levels of noise from the background music and patrons dining, entering and leaving the premises, are shown below in Table 13.

Table 13 Predicted Cumulative L_{eq} Noise Levels – Other Receivers

Description	Predicted Noise Level (dBA)	Noise Criterion (dBA)	Compliance (Yes/No)
Daytime (6 am to 6 pm)			
'R2' – The Scots College Brighton Preparatory			
- Music	31		
- Patrons Outside (Including Courtyard)	40		
- Patrons Inside	39		
Cumulative Noise Level	43	43	Yes
'R3' – Depena Reserve			
- Music	43		
- Patrons Outside (Including Courtyard)	52		
- Patrons Inside	50		
Cumulative Noise Level	54	53	Yes*
Evening (6 pm to 10 pm)			
'R2' – The Scots College Brighton Preparatory			
- Music	31		
- Patrons Outside (12 Patrons In Courtyard)	37		
- Patrons Inside	40		
Cumulative Noise Level	42	43	Yes
'R3' – Depena Reserve			
- Music	43		
- Patrons Outside (12 Patrons In Courtyard)	50		
- Patrons Inside	50		
Cumulative Noise Level	53	53	Yes

*An exceedance of 1 dB is considered negligible. The assessment point has been taken in the reserve as 10 metres from the café building. People in the reserve located more than 10 metres away will be exposed to a lower level.

The predicted cumulative L_{eq} levels of noise from background music inside the restaurant, patrons dining, entering and leaving the restaurant at the residential receivers are within the noise criteria established in Section 3.4 and is therefore acceptable.

4.3.4 Mechanical Plant Noise Levels

The predicted cumulative L_{Aeq} levels of noise from all of the mechanical plant operating during the day and evening are shown below in Table 14.

Table 14 Predicted Cumulative L_{eq} Noise Levels – Day and Evening

Description	Predicted Noise Level (dBA)	Noise Criterion (dBA)	Compliance (Yes/No)
'R1' – Residences Across Russell Avenue	44	45	Yes
'R2' – The Scots College Brighton Preparatory	38	43	Yes
'R3' – Depena Reserve	53	53	Yes

During the night, the only mechanical plant operating will be the cool room condenser. The predicted L_{Aeq} levels of noise from the cool room condenser operating at night is shown below in Table 15.

Table 15 Predicted Cumulative L_{eq} Noise Levels – Night

Description	Predicted Noise Level (dBA)	Noise Criterion (dBA)	Compliance (Yes/No)
'R1' – Residences Across Russell Avenue	38	41	Yes
'R2' – The Scots College Brighton Preparatory	30	43	Yes
'R3' – Depena Reserve	43	53	Yes

The predicted cumulative L_{Aeq} levels of noise from the mechanical plant are summarised in Table 14 and Table 15 at the receptors. The predicted levels of noise meets the noise criteria established in Section 3.4 and is considered acceptable.

If the mechanical plant selection returns items of plant with higher sound power levels, the noise emission from mechanical plant will need to be reassessed.

We recommend that the mechanical plant selection be reviewed at Construction Certificate stage to ensure the acceptable noise levels are met.

5.0 NOISE CONTROL RECOMMENDATIONS

5.1 Number and Location of Patrons

The number of patrons should not exceed 300, with 120 patrons outside and 180 patrons inside.

The central courtyard should have a maximum capacity of 40 patrons.

5.2 Central Courtyard Time Restriction

After 6 pm, the Central Courtyard is to be limited to 12 patrons.

5.3 External Doors

All external doors facing north towards the residences should be kept closed when not in use to reduce noise emission as far as practicable.

Doors facing south to the reserve may remain open at all times.

5.4 Ceiling Construction

To reduce the level of noise transmission through the building envelope to the residential apartments, we recommend building construction as follows:

5.4.1 Roof Construction

The roof structure should have a minimum R_w 40. The following is proposed and acceptable:

- Metal deck roofing;
- 19 mm ply on battens;
- Minimum 135 mm ceiling cavity;
- 100 mm thick insulation (minimum density 11 kg/m^3) installed within the ceiling cavity; and
- 13 mm plasterboard ceiling.

Any penetrations through the ceiling should be acoustically treated.

5.4.2 Wall Construction

We recommend any external walls be constructed to have a minimum R_w 35.

5.4.3 Glazing

We recommend all external glazing be minimum 6.38 mm laminated glass. This includes the fixed glazing and the entry doors.

5.5 Construction Disclaimer

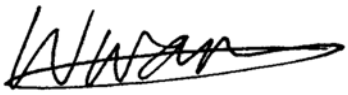
Recommendations made in this report are intended to resolve acoustical problems only. We make no claims of expertise in other areas of building construction and therefore the recommended noise controls should be implements into the building design in consultation with other specialists to ensure they meet the structural, fire, thermal or other aspects of building construction.

We encourage clients to check with us before using materials or equipment that are alternative to those specified in our Acoustical Report.

6.0 NOISE IMPACT STATEMENT

Day Design Pty Ltd has been engaged by Sam Crawford Architects to assess the potential environmental noise impact of the proposed restaurant/café located at Depena Reserve, 179-183 Russell Avenue, Dolls Point, NSW.

Measurements and calculations show that, provided the recommendations in Section 5 of this report are implemented, the level of noise emitted by the restaurant/café at Depena Reserve will meet the requirements of Bayside Council and also the noise level requirements of the NSW Liquor and Gaming, the EPA's *Noise Policy for Industry,* as detailed in Section 4 of this report, and be considered acceptable.



William Wang, BE(Mechatronics), MIEAust, MAAS
Senior Acoustical Engineer
for and on behalf of Day Design Pty Ltd

AAAC MEMBERSHIP
Day Design Pty Ltd is a member company of the Association of Australasian Acoustical Consultants, and the work herein reported has been performed in accordance with the terms of membership.

Attachments:
Appendix A – Noise Survey Instrumentation
Appendix B – Ambient Noise Survey
Appendix C – Architectural Drawings
Appendix D – Mechanical Plant Sketch
Datasheet AC108-1 to 4 – Glossary of Acoustical Terms
Datasheet AC500-10 – Modifying Factor Corrections

NOISE SURVEY INSTRUMENTATION

Noise level measurements and analysis in this report were made with instrumentation as follows:

Table A1 Noise Survey Instrumentation

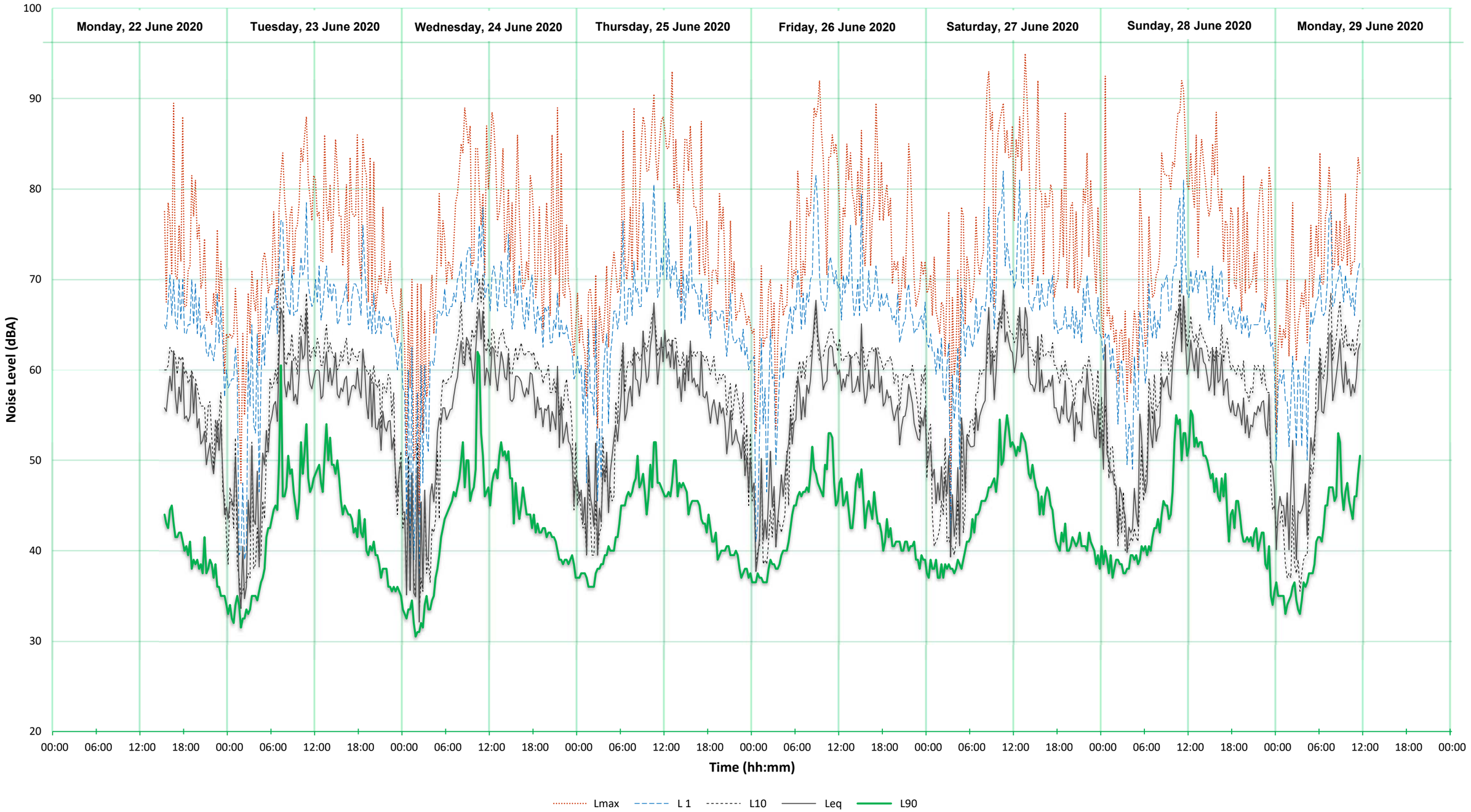
Description	Model No	Serial No
Modular Precision Sound Analyser	B&K 2270 G4	3010781
Condenser Microphone 0.5" diameter	B&K 4189	3099836
Acoustical Calibrator	B&K 4231	2095415
Infobyte Noise Logger (Type 2)	iM4	111
Condenser Microphone 0.5" diameter	MK 250	9261
Acoustical Calibrator	SV30A	10839

An environmental noise logger is used to continuously monitor ambient noise levels and provide information on the statistical distribution of noise during an extended period of time. The Infobyte Noise Monitor iM4s are Type 1 precision environmental noise monitor meeting all the applicable requirements of AS1259 for an integrating-averaging sound level meter.

The B&K 2270 Sound Analyser is a real-time precision integrating sound level meter with octave and third octave filters, that sample noise at a rate of 10 samples per second and provides L_{eq}, L_{10} and L_{90} noise levels using both Fast and Slow response and L_{peak} noise levels on Impulse response time settings. The meter is frequency weighted to provide dBA, dBC or Linear sound pressure level readings as required.

All instrument systems had been laboratory calibrated using instrumentation traceable to Australian National Standards and certified within the last two years thus conforming to Australian Standards. The measurement system was also field calibrated prior to and after noise surveys. Calibration drift was found to be less than 1 dB during attended and unattended measurements. No adjustments for instrument drift during the measurement period were warranted.

Located at Unit 2, 27 Maluya Street, Dolls Point, NSW



RUSSELL AVENUE

Existing west car park
Refer to traffic engineering drawings for details of proposed changes

Loading Zone
Refer to traffic engineering drawings for details of proposed changes

EX RL 1.970

PROP FOOTPATH
RL 2.120

Refer Landscape Architect's documentation for soft planting

Proposed Kiss & Ride
Refer to traffic engineering drawings for details of proposed changes

Existing east car park
Refer to traffic engineering drawings for details of proposed changes

North Site Boundary

Disabled carparking spots, refer council traffic plan

EX RL 2.000

8,731
Existing setback

New accessible pedestrian path at 1:20.1 max gradient

01 A201

01 A301

1:20.1

1:20.1

11,629
Proposed Setback

117,200
Existing setback to West boundary

Ex. fig tree

02 A301

02 A301

Refer Landscape Architect's documentation for soft planting

New accessible pedestrian path at 1:20.1 max gradient

Ex. path

02 A202

01 A202

125,087
Proposed Setback

New accessible pedestrian path at 1:20.1 max gradient

Refer Landscape Architect's documentation for soft planting

New Dolls Point Café
FFL +3,000

Line of existing building

Ex. Shelter

New batter with turf over

Infiltration Tank

RL 2.0

RWT

02 A201

New batter with turf over

01 A301

22,307
Proposed setback

17,146
Existing setback

East Site Boundary

24,522
Proposed setback

21,415
Existing setback

Ex. path

Ex. path

South Site Boundary

DESCRIPTION	REV	APP'D	DATE
50% DA FOR REVIEW	P1	SC	09-12-22
75% DA FOR REVIEW	P2	SC	06-04-23
DA SUBMISSION	P3	SC	20-06-23

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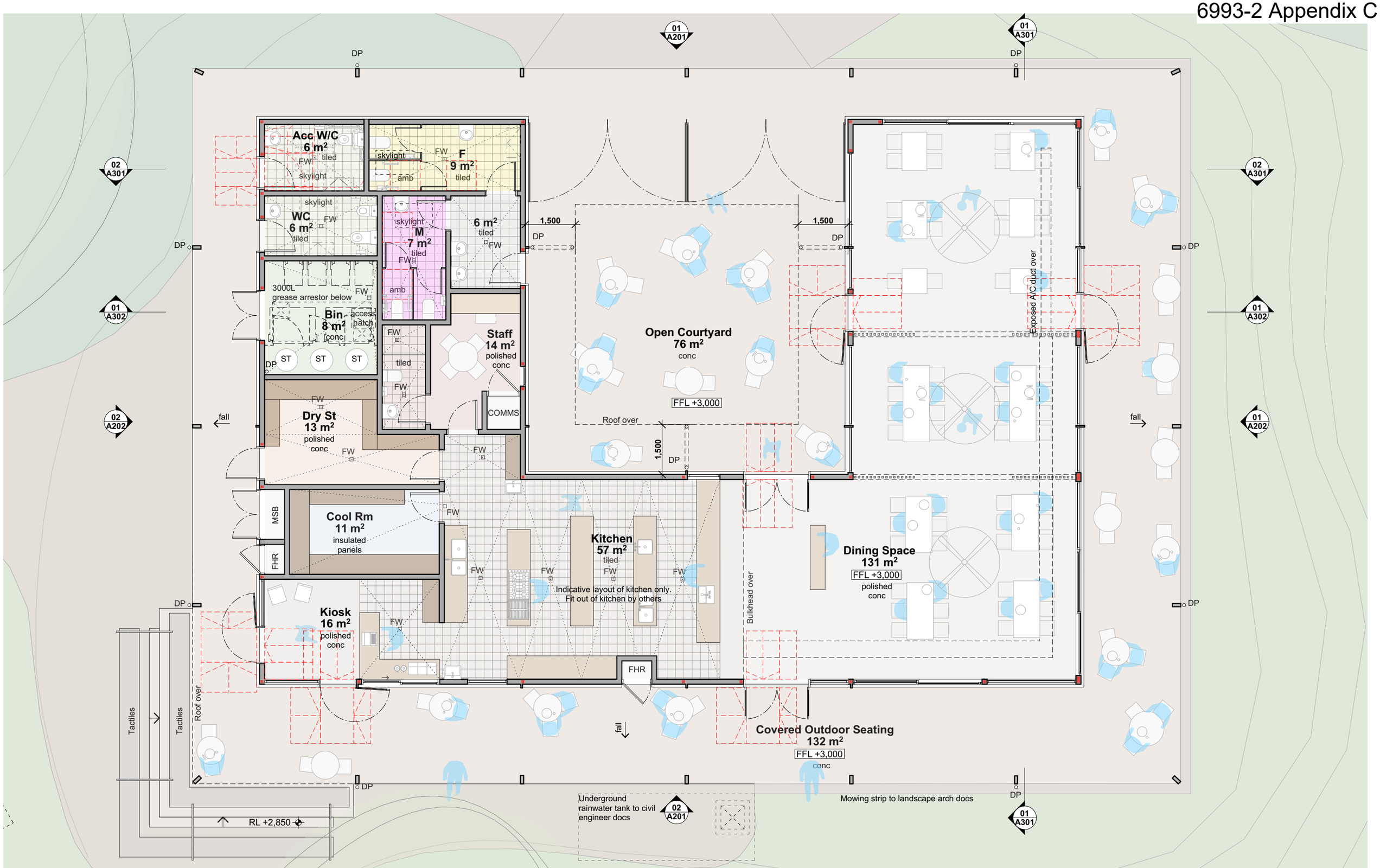
CLIENT
BAYSIDE COUNCIL

PROJECT
DOLLS POINT CAFÉ
179 RUSSELL AVENUE, DOLLS POINT NSW 2219

NORTH POINT

SCALE @ A3	PROJECT NO.	STAGE	DRAWING NO.	REV
1:300	19.34	100	A102	**P3**

DRAWING TITLE
SITE PLAN



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DESCRIPTION	REV	APP'D	DATE
75% DA FOR REVIEW	P2	SC	06-04-23
75% DA FOR REVIEW - UPDATES	P3	SC	18-04-23
DA SUBMISSION	P4	SC	20-06-23

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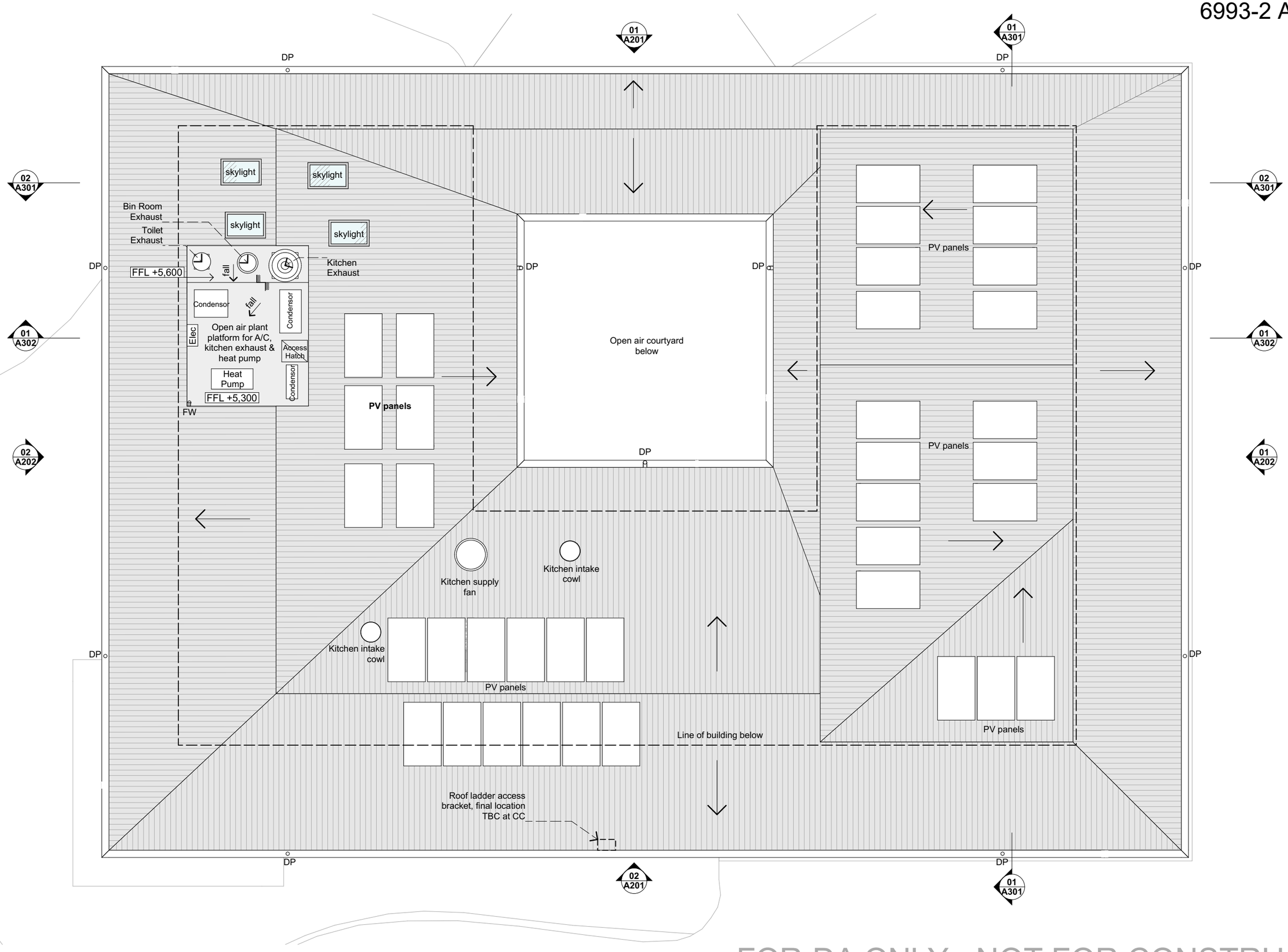
SCALE @ A3	PROJECT NO.	STAGE	DRAWING NO.	REV
1:100	19.34	100	A104	**P4**

DRAWING TITLE
GROUND FLOOR PLAN



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DESCRIPTION	REV	APP'D	DATE
50% DA FOR REVIEW	P1	SC	09-12-22
75% DA FOR REVIEW	P2	SC	06-04-23
DA SUBMISSION	P3	SC	20-06-23

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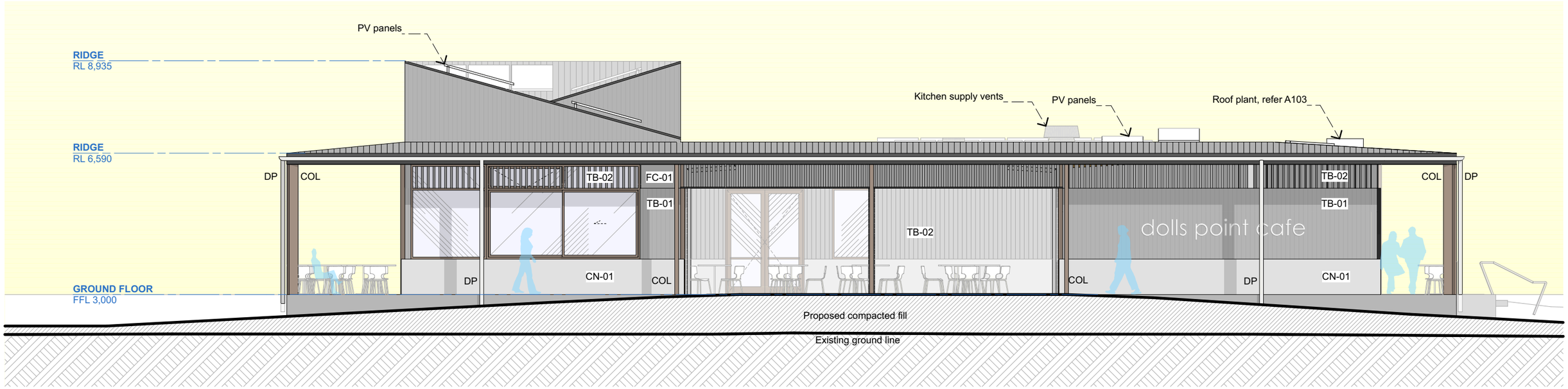
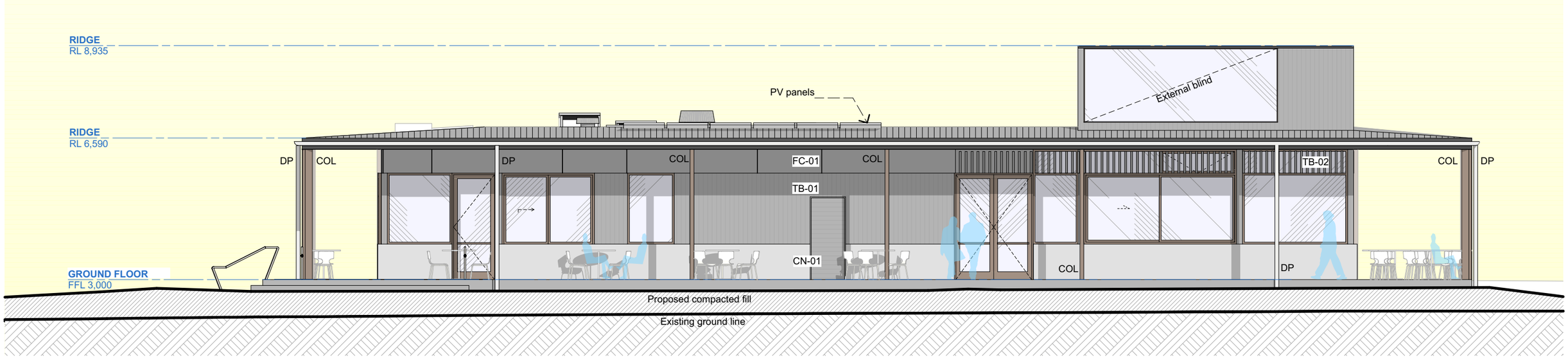
NORTH POINT

SCALE @ A3	PROJECT NO.	STAGE	DRAWING NO.	REV
1:100	19.34	100	A105	**P3**

DRAWING TITLE
ROOF PLAN



01 **NORTH ELEVATION**



02 **SOUTH ELEVATION**

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DESCRIPTION	REV	APP'D	DATE
50% DA FOR REVIEW	P1	SC	09-12-22
75% DA FOR REVIEW	P2	SC	06-04-23
DA SUBMISSION	P3	SC	20-06-23

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PROJECT
DOLLS POINT CAFÉ
179 RUSSELL AVENUE, DOLLS POINT NSW 2219

NORTH POINT

SCALE @ A3	PROJECT NO.	STAGE	DRAWING NO.	REV
1:100	19.34	200	A201	**P3**

DRAWING TITLE
NORTH & SOUTH ELEVATIONS

Printed: 9:27 AM, 20-06-23

600x200 DOOR GRILLE FOR MALE TOILET MAKE-UP AIR. OTHER TOILETS MAEK-UP AIR VIA HIGH LEVEL LOUVRES

200x200 EGG CRATE EXHAUST GRILLES SERVING TOILETS AND BIN ROOM

250x250 TOILET EXHAUST DUCT TO ROOF FAN ABOVE

REFRIGERANT PIEPWORK FROM ABOVE

200x200 BIN EXHAUST DUCT TO ROOF FAN ABOVE

600x400 KITCHEN EXHAUST DUCT TO ROOF FAN ABOVE

300X300 FACE SIZE TRANSFER GRILLES

600X600 FACE SIZE RETURN AIR GRILLE

600X600 FACE SIZE SUPPLY SWIRL DIFFUSER

450MM HIGH CLEAR CEILING VOID REQUIRED FOR 1 OFF IN-CEILING DUCTED UNIT

600MM HIGH CLEAR CEILING VOID REQUIRED FOR 2 OFF IN-CEILING DUCTED UNITS

600x400 KITCHEN SUPPLY DUCT TO ROOF FAN ABOVE

2OFF FRESH AIR ROOF COWLS ABOVE

UFD TO CONFIRM HOOD SIZE, SELECTION AND VENTILATION REQUIREMENTS

11 OFF 300X200 MM (WxH) SUPPLY REGISTERS @ 100L/S EACH

Acc W/C 6 m²
F 9 m²
WC 7 m²
M 7 m²
6 m²
Bin 6 m²
Staff 15 m²
Dry St 15 m²
Cool Rm 13 m²
Kitchen 58 m²
Dining Space 131 m² FFL +3,000
Covered Outdoor Seating 132 m²
skylight
access hatch
FCU-10
A/P
OAP
DP
RL
RL +3,000
RL +2,850
FFL +3,000
1,500
600x400
400x300
400x400
500 DIA
400 DIA
300 DIA
Exposed A/C duct over
Bulkhead over
Roof over

DESCRIPTION

JN Responsive Engineering

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DESIGN	KS
DATE	22/11/2022
SIZE	A3
SCALE	1:100
PROJECT	CONCEPT SKETCH MECHANICAL SERVICES

MECHANICAL SKETCH

LE BEACH HUT DOLLS POINT CAFE GROUND FLOOR

N0221295
MSK-01A

Printed: 5:41 PM, 8/11/2022

REFRIGERANT PIPEWORK TO BELOW

CU-2 - (HxWxD)- 1430X940X320MM

CU-1 - (HxWxD)- 1657X930X765 MM

MECHANICAL SWITCHBOARD- 600X600X300 MM (WXHxD)

COOL ROOM OUTDOOR UNIT TBC BY UFD- NOMINAL ALLOWANCE 1200X600X700

KITCHEN EXHAUST FAN TO BE MINIMUM 6 METERS AWAY FROM INTAKES AND OPENINGS

skylights for toilets below

TOILET EXHAUST FAN

3.4X2.7X1.8 (WxDXH) PLANT FOOTPRINT. PLANT CAN BE SURROUNDED BY LOUVRES WITH MIN 70% FREE AREA AND OPEN TOP

courtyard below

CU-1

CU-2

TEF-1

KEF-1

BEF-1

air plant platform for A/C and kitchen exhaust, entirely over bin room

PV panels

KITCHEN SUPPLY FAN

KSF-1

RC

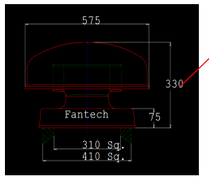
kitchen supply vents

OUTSDIE AIR INTAKE ROOF COWLS

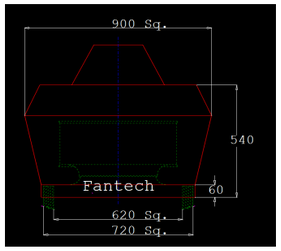
DP

A

B



BIN ROOM EXHAUST FAN



KITCHEN EXHAUST FAN

DESCRIPTION

0

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JN Responsive Engineering

EMAIL (02) 9316 6032)

DESIGN	KS
DATE	22/11/2022
SIZE	A3
SCALE	1:100
PROJECT	CONCEPT SKETCH MECHANICAL SERVICES

MECHANICAL SKETCH

LE BEACH HUT DOLLS POINT CAFE ROOF

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DOLLS POINT CAFE
179 RUSSELL AVENUE DOLLS POINT NSW 2219

NORTH POINT

N0221295
MSK-02A

REV

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ACOUSTICAL – Pertaining to the science of sound, including the generation, propagation, effects and control of both noise and vibration.

AMBIENT NOISE – The ambient noise level at a particular location is the overall environmental noise level caused by all noise sources in the area, both near and far, including road traffic, factories, wind in the trees, birds, insects, animals, etc.

AUDIBLE – means that a sound can be heard. However, there are a wide range of audibility grades, varying from "barely audible" to "just audible", "clearly audible" and "prominent". Chapter 83 of the NSW Environment Protection Authority – Environmental Noise Control Manual (1985) states:
"noise from a particular source might be offensive if it is clearly audible, distinct from the prevailing background noise and of a volume or character that a reasonable person would be conscious of the intrusion and find it annoying or disruptive".

It follows that the word "audible" in an environmental noise context means "clearly audible".

BACKGROUND NOISE LEVEL – Silence does not exist in the natural or the built-environment, only varying degrees of noise. The Background Noise Level is the average minimum dBA level of noise measured in the absence of the noise under investigation and any other short-term noises such as those caused by cicadas, lawnmowers, etc. It is quantified by the L_{A90} or the dBA noise level that is exceeded for 90 % of the measurement period (usually 15 minutes).

- **Assessment Background Level (ABL)** is the single figure background level representing each assessment period – day, evening and night (ie three assessment background levels are determined for each 24hr period of the monitoring period). Determination of the assessment background level is by calculating the tenth percentile (the lowest tenth percent value) of the background levels (L_{A90}) for each period (refer: NSW Industrial Noise Policy, 2000).
- **Rating Background Level (RBL)** as specified by the Environment Protection Authority is the overall single figure (L_{A90}) background noise level representing an assessment period (day, evening or night) over a monitoring period of (normally) three to seven days.

  The RBL for an assessment period is the median of the daily lowest tenth percentile of L_{90} background noise levels.

  If the measured background noise level is less than 30 dBA, then the Rating Background Level (RBL) is considered to be 30 dBA.

DECIBEL – The human ear has a vast sound-sensitivity range of over a thousand billion to one. The decibel is a logarithmic unit that allows this same range to be compressed into a somewhat more comprehensible range of 0 to 120 dB. The decibel is ten times the logarithm of the ratio of a sound level to a reference sound level. See also Sound Pressure Level and Sound Power Level.

Decibel noise levels cannot be added arithmetically since they are logarithmic numbers. If one machine is generating a noise level of 50 dBA, and another similar machine is placed beside it, the level will increase to 53 dBA, not 100 dBA. Ten similar machines placed side by side increase the sound level by 10 dBA, and one hundred machines increase the sound level by 20 dBA.

dBA – The human ear is less sensitive to low frequency sound than high frequency sound. We are most sensitive to high frequency sounds, such as a child's scream. Sound level meters have an inbuilt weighting network, termed the dBA scale, that approximates the human loudness response at quiet sound levels (roughly approximates the 40 phon equal loudness contour).

However, the dBA sound level provides a poor indication of loudness for sounds that are dominated by low frequency components (below 250 Hz). If the difference between the "C" weighted and the "A" weighted sound level is 15 dB or more, then the NSW Industrial Noise Policy recommends a 5 dBA penalty be applied to the measured dBA level.

dBC – The dBC scale of a sound level meter is similar to the dBA scale defined above, except that at high sound intensity levels, the human ear frequency response is more linear. The dBC scale approximates the 100 phon equal loudness contour.

EQUIVALENT CONTINUOUS NOISE LEVEL, L_{Aeq} – Many noises, such as road traffic or construction noise, vary continually in level over a period of time. More sophisticated sound level meters have an integrating electronic device inbuilt, which average the A weighted sound pressure levels over a period of time and then display the energy average or L_{Aeq} sound level. Because the decibel scale is a logarithmic ratio the higher noise levels have far more sound energy, and therefore the L_{Aeq} level tends to indicate an average which is strongly influenced by short term, high level noise events. Many studies show that human reaction to level-varying sounds tends to relate closely to the L_{Aeq} noise level.

FREE FIELD – This is a sound field not subject to significant reflection of acoustical energy. A free field over a reflecting plane is usually outdoors with the noise source resting on hard flat ground, and not closer than 6 metres to any large flat object such as a fence or wall; or inside an anechoic chamber.

FREQUENCY – The number of oscillations or cycles of a wave motion per unit time, the SI unit being the Hertz, or one cycle per second.

IMPACT ISOLATION CLASS (IIC) – The American Society for Testing and Materials (ASTM) has specified that the IIC of a floor/ceiling system shall be determined by operating an ISO 140 Standard Tapping Machine on the floor and measuring the noise generated in the room below. The IIC is a number found by fitting a reference curve to the measured octave band levels and then deducting the sound pressure level at 500 Hz from 110 decibels. Thus the higher the IIC, the better the impact sound isolation.

IMPACT SOUND INSULATION ($L_{nT,w}$) – Australian Standard AS ISO 717.2 – 2004 has specified that the Impact Sound Insulation of a floor/ceiling system be quantified by operating an ISO 140 Standard Tapping Machine on the floor and measuring the noise generated in the room below. The Weighted Standardised Impact Sound Pressure Level ($L_{nT,w}$) is the sound pressure level at 500 Hz for a reference curve fitted to the measured octave band levels. Thus the lower $L_{nT,w}$ the better the impact sound insulation.

IMPULSE NOISE – An impulse noise is typified by a sudden rise time and a rapid sound decay, such as a hammer blow, rifle shot or balloon burst.

INTRUSIVE NOISE LEVEL, L_{Aeq} – The level of noise from a factory, place of entertainment, etc. in NSW is assessed on the basis of the average maximum noise level, or the $L_{Aeq\ (15\ min)}$. This is the energy average A weighted noise level measured over any 15 minute period.

LOUDNESS – The degree to which a sound is audible to a listener is termed the loudness. The human ear perceives a 10 dBA noise level increase as a doubling of loudness and a 20 dBA noise increase as a quadrupling of the loudness.

MAXIMUM NOISE LEVEL, L_{Amax} – The rms maximum sound pressure level measured on the "A" scale of a sound level meter during a noise survey is the L_{Amax} noise level. It may be measured using either the Fast or Slow response time of the meter. This should be stated.

NOISE RATING NUMBERS – A set of empirically developed equal loudness curves has been adopted as Australian Standard AS1469-1983. These curves allow the loudness of a noise to be described with a single NR number. The Noise Rating number is that curve which touches the highest level on the measured spectrum of the subject noise. For broadband noise such as fans and engines, the NR number often equals the dBA level minus five.

NOISE – Noise is unwanted sound. Sound is wave motion within matter, be it gaseous, liquid or solid. "Noise includes sound and vibration".

NOISE REDUCTION COEFFICIENT – See: "Sound Absorption Coefficient".

OFFENSIVE NOISE - (Reference: Dictionary of the Protection of the Environment Operations Act 1997). *"Offensive Noise means noise:*

(a) that, by reason of its level, nature, character or quality, or the time at which it is made, or any other circumstances:

(i) is harmful to (or likely to be harmful to) a person who is outside the premise from which it is emitted, or

(ii) interferes unreasonably with (or is likely to interfere unreasonably with) the comfort or repose of a person who is outside the premises from which it is emitted, or

(b) that is of a level, nature, character or quality prescribed by the regulations or that is made at a time, or in other circumstances prescribed by the regulations."

PINK NOISE – Pink noise is a broadband noise with an equal amount of energy in each octave or third octave band width. Because of this, Pink Noise has more energy at the lower frequencies than White Noise and is used widely for Sound Transmission Loss testing.

REVERBERATION TIME, T_{60} – The time in seconds, after a sound signal has ceased, for the sound level inside a room to decay by 60 dB. The first 5 dB decay is often ignored, because of fluctuations that occur while reverberant sound conditions are being established in the room. The decay time for the next 30 dB is measured and the result doubled to determine the T_{60}. The Early Decay Time (EDT) is the slope of the decay curve in the first 10 dB normalised to 60 dB.

SOUND ABSORPTION COEFFICIENT, α – α Sound is absorbed in porous materials by the viscous conversion of sound energy to heat energy as the sound waves pass through it. Sound is similarly absorbed by the flexural bending of internally damped panels. The fraction of incident energy that is absorbed is termed the Sound Absorption Coefficient, α. An absorption coefficient of 0.9 indicates that 90 % of the incident sound energy is absorbed. The average α from 250 to 2000 Hz is termed the Noise Reduction Coefficient (NRC).

SOUND ATTENUATION – If an enclosure is placed around a machine, or a silencer is fitted to a duct, the noise emission is reduced or attenuated. An enclosure that attenuates the noise level by 30 dBA, reduces the sound energy by one thousand times.

SOUND EXPOSURE LEVEL (SEL) – The total sound energy of a single noise event condensed into a one second duration or in other words it is an L_{eq} (1 sec).

SOUND PRESSURE LEVEL, L_p – The level of sound measured on a sound level meter and expressed in decibels, dB, dBA, dBC, etc. $L_p = 20 \times \log (P/P_o)$ ... dB

where P is the rms sound pressure in Pascal and P_o is a reference sound pressure of 20 µPa. L_p varies with distance from a noise source.

SOUND POWER LEVEL, L_w – The Sound Power Level of a noise source is an absolute that does not vary with distance or with a different acoustic environment.

$L_w = L_p + 10 \log A$ ... dB, re: 1pW,
where A is the measurement noise-emission area in square metres in a free field.

SOUND TRANSMISSION CLASS (STC) – An internationally standardised method of rating the sound transmission loss of partition walls to indicate the decibels of noise reduction of a human voice from one side to the other. (Refer: Australian Standard AS1276 – 1979)

SOUND TRANSMISSION LOSS – The amount in decibels by which a random sound is reduced as it passes through a sound barrier. A method for the measurement of airborne Sound Transmission Loss of a building partition is given in Australian Standard AS1191 - 2002.

STATISTICAL EXCEEDENCE SOUND LEVELS, L_{A90}, L_{A10}, L_{A1}, etc – Noise which varies in level over a specific period of time (usually 15 minutes) may be quantified in terms of various statistical descriptors:

The L_{A90} is the dBA level exceeded for 90 % of the time. In NSW the L_{A90} is measured over periods of 15 minutes, and is used to describe the average minimum or background noise level.

The L_{A10} is the dBA level that is exceeded for 10 % of the time. In NSW the L_{A10} measured over a period of 10 to 15 minutes. It was until recently used to describe the average maximum noise level, but has largely been replaced by the L_{Aeq} for describing level-varying noise.

The L_{A1} is the dBA level that is exceeded for 1 % of the time. In NSW the L_{A1} may be used for describing short-term noise levels such as could cause sleep arousal during the night.

STEADY NOISE – Noise, which varies in level by 6 dBA or less, over the period of interest with the time-weighting set to "Fast", is considered to be "steady". (Refer AS 1055.1 1997)

WEIGHTED SOUND REDUCTION INDEX, R_w – This is a single number rating of the airborne sound insulation of a wall, partition or ceiling. The sound reduction is normally measured over a frequency range of 100 to 3,150 Hertz and averaged in accordance with ISO standard weighting curves (Refer AS/NZS 1276.1:1999).

Internal partition wall $R_w + C$ ratings are frequency weighted to simulate insulation from human voice noise. The $R_w + C$ is always similar in value to the STC rating value. External walls, doors and windows may be $R_w + C_{tr}$ rated to simulate insulation from road traffic noise. This is normally a lower number than the STC rating value.

WHITE NOISE – White noise is broadband random noise whose spectral density is constant across its entire frequency range. The sound power is the same for equal bandwidths from low to high frequencies. Because the higher frequency octave bands cover a wider spectrum, white noise has more energy at the higher frequencies and sounds like a hiss.

Table C.1 Modifying factor corrections
(See definitions in Section C2)

Factor	Assessment/ Measurement	When to apply	Correction[1]	Comments
Tonal noise	One-third octave band analysis using the objective method for assessing the audibility of tones in noise – simplified method (*ISO1996.2-2007 – Annex D*).	Level of one-third octave band exceeds the level of the adjacent bands on both sides by: • 5 dB or more if the centre frequency of the band containing the tone is in the range 500–10,000 Hz • 8 dB or more if the centre frequency of the band containing the tone is in the range 160–400 Hz • 15 dB or more if the centre frequency of the band containing the tone is in the range 25–125 Hz.	5 dB [2, 3]	Third octave measurements should be undertaken using unweighted or Z-weighted measurements. **Note:** Narrow-band analysis using the reference method in *ISO1996-2:2007, Annex C* may be required by the consent/regulatory authority where it appears that a tone is not being adequately identified, e.g. where it appears that the tonal energy is at or close to the third octave band limits of contiguous bands.
Low frequency noise	Measurement of source contribution C-weighted and A-weighted level and one-third octave measurements in the range 10–160 Hz	Measure/assess source contribution C- and A-weighted Leq,T levels over same time period. Correction to be applied where the C minus A level is 15 dB or more and: • where any of the one-third octave noise levels in Table C2 are exceeded by up to and including 5 dB and cannot be mitigated, a 2 dB(A) positive adjustment to measured/predicted A-weighted levels applies for the evening/night period • where any of the one-third octave noise levels in Table C2 are exceeded by more than 5 dB and cannot be mitigated, a 5-dB(A) positive adjustment to measured/predicted A-weighted levels applies for the evening/night period and a 2dB(A) positive adjustment applies for the daytime period.	2 or 5 dB[2]	A difference of 15 dB or more between C- and A-weighted measurements identifies the potential for an unbalance spectrum and potential increased annoyance. The values in Table C2 are derived from Moorhouse (2011) for DEFRA fluctuating low-frequency noise criteria with corrections to reflect external assessment locations.

Table C.1 Modifying factor corrections – continued

Factor	Assessment/ Measurement	When to apply	Correction[1]	Comments
Intermittent noise	Subjectively assessed but should be assisted with measurement to gauge the extent of change in noise level.	The source noise heard at the receiver varies by more than 5 dB(A) and the intermittent nature of the noise is clearly audible.	5 dB	Adjustment to be applied for **night-time only**
Duration	Single-event noise duration may range from 1.5 min to 2.5 h.	One event in any assessment period.	0 to 20 dB(A)	The project noise trigger level may be increased by an adjustment depending on duration of noise (see Table C3).
Maximum Adjustment	Refer to individual modifying factors.	Where two or more modifying factors are indicated.	Maximum correction of 10 dB(A)[2] (excluding duration correction).	

Notes:

1. *Corrections to be added to the measured or predicted levels, except in the case of duration where the adjustment is to be made to the criterion.*
2. *Where a source emits tonal and low-frequency noise, only one 5-dB correction should be applied if the tone is in the low-frequency range, that is, at or below 160 Hz.*
3. *Where narrow-band analysis using the reference method is required, as outlined in column 5, the correction will be determined by the ISO1996-2:2007 standard.*