Acoustic Assessment Report

Community & Boarding House Development

28 Fisher Road & 9 Francis Street, Dee Why

Prepared for The George Group
Report Reference: 20SYA0029 R01_0

About TTM

For 30 years, we've been at the centre of the Australian development and infrastructure industry. Our unique combination of acoustics, data, traffic and waste services is fundamental to the success of any architectural or development project.

We have over 50 staff, with an unrivalled depth of experience. Our industry knowledge, technical expertise and commercial insight allow us to deliver an exceptional and reliable service.

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Revision Record

No.	Author	Reviewed/Approved	Description	Date
A.	K Dhayam	-	Draft A – Issued to client	25/06/2020
B.	K Dhayam	-	Draft B – Issued to client	06/07/2020
0.	J Fox		Acoustic report	12/08/2020

Executive Summary

TTM Consulting conducted an acoustic assessment for the proposed community and boarding house development located at 28 Fisher Road & 9 Francis Street, Dee Why NSW 2099 for The George Group. Noise monitoring of existing ambient noise levels was conducted in the area and noise impact levels of the proposed development were predicted and assessed.

The development is predicted to comply with Warringah Development Control Plan (DCP) 2011 and the NSW Noise Policy for Industry 2017, with no additional noise mitigation measures are required. A detailed acoustic assessment of mechanical plant during the detailed design stage is, however, recommended when the plant specifications are finalised. Management control measures have also been recommended to ensure reasonable and acceptable noise emissions levels from the proposed development.

This report demonstrates that the proposed development is feasible and reasonable, whilst keeping an appropriate acoustic amenity and controlled noise impact to the local community.

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1 Introduction

TTM was engaged by The George Group to undertake an acoustic assessment of the proposed community and boarding house development located at 28 Fisher Road & 9 Francis Street, Dee Why NSW 2099. The assessment addresses the impact of the development on the existing local community. This report will form part of the development application for consideration by Northern Beaches Council.

The assessment is based on the following:

- Warringah Local Environmental Plan (LEP) 2011
- Warringah Development Control Plan (DCP) 2011
- NSW Noise Policy for Industry 2017[1]
- Architectural plans prepared by The George Group, dated August 2020, as presented in Appendix A.

[1] NSW Environment Protection Authority (2017), Noise Policy for Industry

2 Site Description

The subject site is located within the Warringah LEP, at 28 Fisher Road & 9 Francis Street, Dee Why, within a R3 Medium Density Residential land zoning. On the Fisher Road end of the site is an established retail and commercial precinct for the local community. The precinct currently provides an array of professional services, cafés, restaurants, etc. On the Francis Street end of the site is existing medium density residential properties, consisting mainly of multi-storey residential units.

The site is bounded by existing residential and commercial properties to the north and south. Across Francis Street to the west are existing residential properties. Across Fisher Road to the east is The Salvation Army building and car parking facilities.

There are currently a commercial building and car parking facilities at the site.

An aerial image of the site locality is shown in Figure 1.

Figure 1: Site Locality

3 Proposed Development

The existing structures at the site will be demolished to make way for the proposed five-storey development comprising of the following:

- 80 boarding units and one manager unit (81 in total) across five floors (Ground to Level 4).
- Other uses on the ground floor:
  - Church/conference area (Auditorium):
    - Used for community gatherings, conferences, weddings, and other similar functions for entertainment purposes,
    - Expected capacity of 150-200 people,
    - Operation hours typically between 7am and 10pm,
    - Amplified music and speech are expected to be used.
  - Café area, outdoor café takeaway area and kitchen area:
    - Operation hours typically between 6am and 6pm,
    - Service the patrons of the auditorium and provide takeaway services to the general public.
  - Other general amenities, such as toilets and storage.
- Level 5 – Multipurpose space, offices, storage and rooftop garden.
- 60 car parking spaces with stackers in the basement area.
- Level 5 rooftop communal garden area (Fisher Road End) – Small gatherings of 10 residents or less.

The acoustic assessment addresses the noise impact of the proposed development, including mechanical plant noise, café and kitchen noise, noise from the auditorium and noise from the use of the outdoor communal areas on the identified noise sensitive receivers. The proposed site plan is presented in Figure 2.

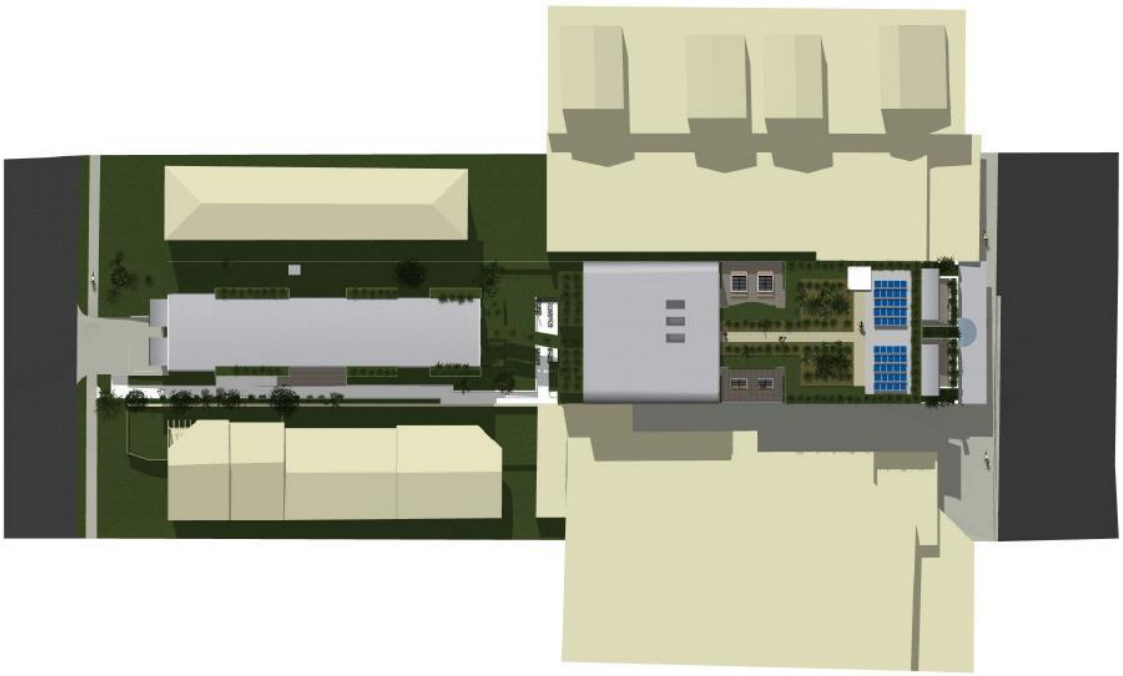


Figure 2: Site Plan

3.1 Noise Sensitive Receivers

The closest existing noise sensitive receivers (NSRs) to the proposed development have been identified and are as follows, as shown in Figure 3:

- R1 – Commercial property at 30 Fisher Road located directly north of site
- R2 – Commercial property at 22-26 Fisher Road located directly south of site
- R3 – Residential property at 11 Francis Street located directly north of site, and
- R4 – Residential property at 7 Francis Street located directly south of site.

Noise mitigation and management measures implemented to achieve compliance at the identified NSRs ensure that impact at properties located further away will also achieve compliance as impact will be significantly less.

Figure 3: Noise Sensitive Receivers

4 Noise Survey

TTM conducted a site inspection on the 21st May 2020 at the site and its immediate surroundings. During the site inspection, existing environmental noise sources and noise sensitive receivers were identified.

The area was observed to be typical of an urban area with an acoustical environment dominated by the urban 'hum' with a mix of local retail and commercial activity and local road traffic. The area is already characterised by medium density residential area along Francis Street. Traffic on Fisher Road at the site location was generally busier than on Francis Street due to local commercial activities on the Fisher Road end of the site.

Unattended ambient noise monitoring was conducted between the 21st and 29th May 2020 to capture representative ambient noise levels at the site. Noise levels were captured generally in accordance with the recommendations of Australian Standard AS 1055[2].

The noise monitoring location is shown in Figure 4.

Figure 4: Noise Monitoring Location

4.1 Equipment and Observations

The equipment used to measure existing ambient noise levels at the site are presented in Table 1. All measurements were recorded in average, maximum and statistical noise parameters at 15-minute intervals using fast response.

[2] AS 1055:2018 Acoustics - Description and measurement of environmental noise

Table 1: Measurement Equipment and Observations

Type of Measurement	Equipment Model, Type and Serial Number	Observations
Unattended – Long term ambient noise	Brüel & Kjær Model 2250 Light Noise Logger (S/N 3006261)	To ensure the security of noise logger and considering access restrictions, the logger was installed at the location shown in Figure 4. The noise environment was dominated by local road traffic activity and nearby mechanical plant noise. The noise logger was used to capture long-term existing ambient noise levels representative of the site area.
Calibration – Check equipment	Brüel & Kjær Model 4231 Sound Calibrator (S/N 3009809)	Noise logger and sound level meter were both calibrated on-site before and after measurements/monitoring and no significant drift was observed.

4.2 Weather Conditions

During the noise monitoring period, weather conditions were monitored via the Bureau of Meteorology[3] website and showed adverse weather conditions on the 22nd and 27th May 2020 (Ref: Terrey Hills). Data recorded during adverse weather conditions were excluded from the results of the noise survey.

4.3 Monitoring Results

Table 2 presents the statistical noise levels measured by the unattended noise logger installed on site. The daily noise monitoring results are represented graphically in Appendix B. The monitoring results are used to derive the environmental noise targets applicable to the proposed development.

Table 2: Noise Monitoring Results – Ambient Noise Descriptors

Period	Existing Noise Levels in dB(A)			
	Rating Background Noise Levels, RBL L_{90}	L_{eq}	L_{10}	L_1
Day	48	56	59	74
Evening	43	52	54	62
Night	41	47	51	60

Note:
- Day-time period is from 0700 to 1800 (Monday to Saturday) and 0800 to 1800 (Sundays and Public Holidays)
- Evening period is from 1800 to 2200
- Night-time period is from 2200 to 0700 (Monday to Saturday) and 2200 to 0800 (Sundays and Public Holidays)

[3] http://www.bom.gov.au/nsw/observations/nswall.shtml?ref=hdr

5 Noise Criteria

The main guidelines, standards and other policy documents relevant to the assessment contained in this acoustic report include:

- Warringah Development Control Plan (DCP) 2011, and
- Noise emissions to the local community – NSW Noise Policy for Industry 2017.

5.1 Warringah DCP

The Warringah DCP provides design objectives to ensure that noise emission from new development does not unreasonably diminish the amenity of the area or result in noise intrusion which would be unreasonable for occupants, users or visitors. Recommendations generally include achieving compliance with all relevant noise and vibration standards, guidelines and legislation, such as the NSW Noise Policy for Industry 2017.

The noise impact will be assessed in accordance with the NSW Noise Policy for Industry 2017 which takes into consideration all the recommendations and requirements of Australian Standards and the Protection of the Environment (Operations Act) 1997.

5.2 NSW Noise Policy for Industry 2017

For the impact assessment, reference has been made to the NSW Noise Policy for Industry 2017. The policy sets out the procedure to determine the project noise trigger levels relevant to assess noise from mechanical plant and equipment, and other industrial noise sources. The project noise trigger level applies to existing noise-sensitive receivers.

The project noise trigger level provides a benchmark or objective for assessing a proposal or site. It is not intended for use as a mandatory requirement. The project noise trigger level is a level that, if exceeded, would indicate a potential noise impact on the community, and so 'trigger' a management response, for example, further investigation of mitigation measures.

The project noise trigger level is the lower (that is, the more stringent) value of the project intrusiveness noise level and project amenity noise level as specified in Sections 2.3 and 2.4 of the policy.

5.2.1 Project Intrusiveness Noise Level

The Noise Policy for Industry states:

> *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 background noise level by more than 5 dB when beyond a minimum threshold. This intrusiveness noise level seeks to limit the degree of change a new noise source introduces to an existing environment.*

The intrusiveness noise level is determined as follows:

$$L_{Aeq,\ 15min} \leq \text{Rating Background Noise Level} + 5\ dB$$

5.2.2 Amenity Noise Levels and Project Amenity Noise Levels

To limit continuing increases in noise levels from application of the intrusiveness level alone, the ambient noise level within an area from all industrial noise sources combined should remain below the recommended amenity noise levels specified in Table 2.2 of the Noise Policy for Industry where feasible and reasonable. The recommended amenity noise levels will protect against noise impacts such as speech interference, community annoyance and some sleep disturbance. The noise amenity area is defined as urban residential and retail/commercial. The relevant noise amenity levels are given in Table 3.

Table 3: Amenity Noise Levels

Noise Amenity Area of Receiver	Assessment Period	Recommended Amenity Noise Level, L_{eq} dB(A)
Residential Urban	Day	60
	Evening	50
	Night	45
Retail/Commercial premises	When in use	65

Note:
- Day-time period is from 0700 to 1800 (Monday to Saturday) and 0800 to 1800 (Sundays and Public Holidays)
- Evening period is from 1800 to 2200
- Night-time period is from 2200 to 0700 (Monday to Saturday) and 2200 to 0800h (Sundays and Public Holidays)

The recommended amenity noise levels represent the objective for total industrial noise at a receiver location, whereas the project amenity noise level represents the objective for noise from a single industrial development at a receiver location.

To ensure that industrial noise levels (existing plus new) remain within the recommended amenity noise levels for an area, a project amenity noise level applies for each new source of industrial noise as follows:

Project amenity noise level for industrial developments = Recommended amenity noise level minus 5 dB(A)

5.2.3 Project Noise Trigger Level

The project noise trigger level (PNTL) has been determined in Table 4.

Table 4: NSW Noise Policy for Industry Evaluated Criteria

Assessment Period	Project Intrusiveness Noise Level $L_{eq,15min}$ dB(A)	Project Amenity Noise Level $L_{eq,15min}$ dB(A)	Project Noise Trigger Level $L_{eq,15min}$ dB(A)
Day	53	55	**53**
Evening	47	45	**45**
Night	46	40	**40**
Retail/Commercial (When in use)	-	60	**60**

Note:
- Day-time period is from 0700 to 1800 (Monday to Saturday) and 0800 to 1800 (Sundays and Public Holidays)
- Evening period is from 1800 to 2200
- Night-time period is from 2200 to 0700 (Monday to Saturday) and 2200 to 0800h (Sundays and Public Holidays)

Table 4 shows that for residential receivers, the project intrusiveness noise level is more stringent than the project amenity noise level in the day-time assessment period only. The project amenity noise levels for the evening and night-time assessment periods are more stringent in this case, and therefore, make the PNTLs for this assessment.

For retail/commercial receivers, the PNTL is defined by the derived project amenity noise level.

6 Noise Assessment

This section of the report assesses the noise impact from the development to the local community, including:

- Mechanical plant noise
- Operational noise from the Church/conference area (Auditorium)
- Operational noise from the café
- Noise from the use of the rooftop communal areas, and
- Noise from additional road traffic generated by the development.

6.1 Mechanical Plant Noise

Mechanical plant and equipment are proposed for the development to service the auditorium, boarding units, café and kitchen, such as for air-conditioning and refrigeration. The final locations and specifications of mechanical plant and equipment have not been finalised yet, however noise limits have been derived to assist in the selection of future mechanical plant.

Future mechanical plant may have an adverse effect onto nearby noise sensitive receivers, and are required to meet the NSW Noise Policy for Industry PNTL derived in this report. The most stringent PNTL for residential noise sensitive receivers is during the night-time assessment period at **40 dB(A) L_{eq}**. For commercial noise sensitive receivers, the PNTL is **60 dB(A) L_{eq}** (Refer to Table 4).

Based on the floor plans of the development and aerial photographs and considering a worst-case scenario where mechanical plant is located at the site's boundary on grade, the noise limit of each mechanical plant must not exceed **53 dB(A) L_{eq} measured at one metre** from the source to achieve compliance. The noise limits may be less stringent depending on the location of the plant and any potential noise shielding from existing structures. However, further noise control measures such as, an acoustic enclosure may be required to achieve compliance.

The noise limit should be used as a guide in the selection of mechanical plant and equipment, and consideration of acoustic enclosures.

6.2 Use of Auditorium

The auditorium is expected to be used for community gatherings, conferences, weddings, and other functions for entertainment purposes with a capacity of 150-200 people, typically between 7am and 10pm. No night-time use is expected.

The main cause of disturbance is expected to be from amplified music and speech inside the area. Small loudspeakers are proposed to be installed in the auditorium area, along the perimeter of the space and across the ceiling. No loudspeakers are expected to be installed outside of the auditorium area.

The auditorium has no external openings such as windows or doors. The area is accessible through the foyer area which are separated by a door, which may be open during certain activities. Guests are expected to enter the auditorium via the foyer which is accessible from Fisher Road.

Due to the nature of the proposed activities in the auditorium, the live music and entertainment noise limit have been derived to ensure the acoustic amenity of the local community is preserved. The derived noise limit is applicable to amplified music noise and patron noise inside the auditorium.

6.2.1 Live Music and Entertainment Noise Limit

The standard conditions relevant to entertainment noise emissions within the auditorium are summarised below:

1. The L_{A10} noise level emitted from the licensed premises shall not exceed the background noise level in any Octave Band Centre (31.5 Hz – 8 kHz inclusive) by more than 5 dB between 7am and 10pm at the boundary of any affected residence.
2. Interior noise levels are not to exceed safe hearings levels.
3. The premises shall not conduct live entertainment after 10pm.
4. Amplified loudspeakers shall not be directed towards any footpath or face any external openings from building boundary walls.

The live music and entertainment noise limits have been calculated as shown in Table 5.

Table 5: Calculated Noise Limits

Description	Parameter	Overall dB(A)	Octave band frequency (Hz), in dB (Linear)								
			31.5	63	125	250	500	1k	2k	4k	8k
Attended background noise spectra at Noise Monitoring Location, measured in the day-time period on 21/05/2020	L_{90}	46	51	52	49	45	43	41	38	33	23
Adjusted noise spectra to reflect long-term noise monitoring evening-time results of 43 dB(A). – Refer to Table 2	L_{90}	43	48	50	46	42	40	38	35	30	20
Noise Criteria at Boundary of Noise Sensitive Receivers ($L_{10} = L_{90} + 5$)	L_{10}	48	53	55	51	47	45	43	40	35	25
Noise Limit at closest Façade of Church/Conference Area	L_{10}	62	67	68	65	61	59	57	54	49	39
Noise Limit inside Auditorium through external brick wall façade (Foyer Door Closed)	**L_{10}**	**130**	**97**	**102**	**99**	**95**	**99**	**113**	**127**	**125**	**112**
Noise Limit inside Auditorium through Open Foyer Door	**L_{10}**	**105**	**98**	**102**	**101**	**101**	**102**	**101**	**98**	**92**	**82**

The calculated noise limits show that a maximum reverberant noise level of **105 dB(A) L_{10}** is acceptable inside the auditorium with the foyer door open in order to comply with the applicable Live Music and Entertainment Noise Criteria.

For the proposed type of music and entertainment activities within the area, noise levels of less than 100 dB(A) L_{10} is expected. Noise levels above 100 dB(A) L_{10} are typically associated with levels at rock concerts which is not the case here. As such, no additional noise mitigation will be required to control entertainment noise emissions at the premises.

6.3 Café Operations

The café is typically expected to operate from 6am to 6pm, Monday to Sunday to service the patrons of the auditorium and provide takeaway services to the general public. Buffer periods either side of the operating hours are expected to enable staff to arrive or leave.

The café will give rise to patron noise which may cause an adverse effect on the acoustic amenity of the local community. The noise impact of patrons in the expected outdoor seating areas and patrons who may wait outside the café for takeaway orders have been assessed. The assessment includes patrons engaging into verbal communication with staff and among themselves, and its impact at the noise sensitive receivers.

Based on a noise level of 60 dB(A) L_{eq}[4] for normal, raised voice during one conversation, it is predicted that a maximum number of 30 people may engage into verbal communication simultaneously to achieve compliance with night-time PNTL of **53 dB L_{Aeq}** at the closest receiver, R4.

Given the size of the café, it is an unlikely event that 30 people will engage into verbal communication at the café at any one time. The impact from patron noise, and thus the operational noise of the café, is therefore predicted to be insignificant. No noise mitigation measures are recommended.

6.4 Rooftop Communal Areas

The rooftop communal areas may cause an adverse effect on the acoustic amenity of the local community. It is understood that Council have requested that no external gatherings occur on the rooftop and these areas are made internal.

The Fisher Road end rooftop communal area is approximately 10-15 metres from the closest residential receiver. Social gatherings is expected typically from 7am to 10pm. It is expected that access to the rooftop area will be restricted after 10pm.

The most stringent criteria is in the evening assessment period where the derived PNTL is **45 dB L_{Aeq}**. Based on a closed façade and a noise level of 60 dB(A) L_{eq}[5] for normal, raised voice during one conversation, it is predicted that a maximum number of **300** people may engage into verbal communication simultaneously to achieve compliance with the evening-time PNTL of **45 dB L_{Aeq}** at the closest residential receiver.

[4] Lazarus, H. (1986). Prediction of verbal communication in noise – A review: Part 1. Applied Acoustics, vol. 19, pp. 439-464

[5] Lazarus, H. (1986). Prediction of verbal communication in noise – A review: Part 1. Applied Acoustics, vol. 19, pp. 439-464

Based on the expected use of the communal area, the noise impact from social use of the community areas is therefore predicted to be reasonable and acceptable.

6.4.1.1 Background Music

To comply with the evening PNTL of 45 dB L_{Aeq} at the closest residential receivers, background music inside the MP communal zone may emit up to **88 dB(A) L_{eq} measured at 1 metre** from the internally mounted speakers with the facade closed. Background music typically achieves less than 65-70 dB(A) in a social environment to achieve good sound intelligibility. Therefore, background music played at reasonable levels inside the rooftop community area is not expected to adversely the acoustic amenity of the local community. It is however recommended to advise and remind the residents to adhere to responsible social practices to ensure the acoustic amenity of the area is not adversely impacted.

6.5 Road Traffic Generated by Development

Additional traffic will be generated from the proposed development. However, as a ratio of existing traffic flows during peak hours on the surrounding road network, additional traffic generated from the development is not expected to cause any significant increase in road traffic noise to existing noise sensitive receivers, typically resulting in an increase of less than 1dB during peak hour.

7 TTM Recommendations

Based on the noise assessment, recommendations have been made to ensure compliance with the relevant noise criteria is achieved.

7.1 Mechanical Plant Noise

Plant may need to be acoustically treated to prevent noise emissions from adversely impacting NSRs. This may include selecting the quietest plant possible, or treating the plant and equipment with enclosures, acoustic louvres, barriers, duct lining and silencers, etc.

It is also recommended to install mechanical plant away from residential boundaries and bedroom windows in order to avoid direct line of sight to minimise noise impact during the night-time period.

A detailed mechanical plant noise assessment should be conducted by a suitably qualified acoustic consultant once plant selections are made. The noise assessment should include noise source levels of plant, location, adjustments for mechanical plant noise characteristics and application of practical and effective noise control to verify compliance with the relevant noise criteria derived in this report.

7.2 Management of Auditorium

The use of the auditorium is not expected to cause any significant impact onto nearby noise sensitive receivers. However, the following management practices are recommended to ensure the noise limits are adhered to, such as:

1. Installation of loudspeakers facing away from the any opening of the area, such as windows and doors.
2. Installation of individual speakers at least 3 metres apart.
3. The door to the foyer may remain open.
4. The premises shall not conduct live entertainment after 10pm. All amplified music or speech should be stopped before 10pm.
5. Crowd management control measures are also recommended to be implemented to focus on the following:
    - Ensure a clear flow of people in and around the area.
    - Minimise crowd gatherings on the footpath, especially after 10pm.
    - Direct people to the exit areas, such as basement car parking, to ensure all crowds are dispersed smoothly after gatherings.

7.3 Management of Rooftop Communal Areas

The rooftop communal area is not expected to cause any significant impact onto nearby noise sensitive receivers.

The area is expected to be used for social outdoor gatherings generally in the day and evening assessment periods only. However, the following general recommendations have been made to manage the noise impact from the use of the rooftop area:

- Restrict access to the day and evening assessment periods only, which is from 7am to 10pm, or 8am to 10pm on Sundays and public holidays.
- Display signs to ensure noise is kept to a minimum after 10pm, if access is permitted.
- Provide clear instructions to the residents on maintaining responsible social practices at all times.

8 Conclusion

Following the acoustic assessment conducted by TTM for The George Group specifically for the proposed community and boarding house development located at 28 Fisher Road & 9 Francis Street, Dee Why NSW 2099, TTM concludes the following:

- The noise emissions of each mechanical plant, including corrections for tonal and impulsive noise characteristics, must not exceed 53 dB(A) L_{eq} measured at one metre from the source.
- A detailed noise assessment of the mechanical plant during the detailed design stage is recommended. The noise assessment should include noise source levels of plant, location, adjustments for plant noise characteristics, the cumulative noise effect of all plant noise, and practical effective noise control where required to verify compliance with the criteria.
- Operational noise from the café is predicted to be insignificant.
- For the auditorium, a maximum reverberant noise level of 105 dB(A) L_{10} is acceptable inside the space with the foyer door open in order to comply with the applicable Live Music and Entertainment Noise Criteria, and is not expected to be exceeded.
- The use of the rooftop communal area is not predicted to impact the acoustic amenity of the local community.
- Additional traffic generated from the development is not expected to cause any significant increase in road traffic noise during peak hour to other noise sensitive receivers.
- Management measures have been recommended for the auditorium and the rooftop communal area to assist in maintaining reasonable and acceptable noise emissions levels.

The assessment and recommendations contained in this report demonstrate the development is feasible and reasonable, whilst maintaining an appropriate acoustic amenity and controlled noise impact to the local community.

Appendix A Relevant Development Plans

NOTES

ALL CARPARKING SPACES TO CONFORM WITH AS 2890.1 @ 2500mm x 5400mm

SEPP 0.5/unit x 80	= 40 spaces
Manager	= 1 spaces
Cafe	= 3 spaces
Church	= 16 spaces
	= 60 spaces
Motorcycle Parking	= 16 spaces (80 / 5 = 16)
Bicycle Parking	= 16 spaces (80 / 5 = 16)

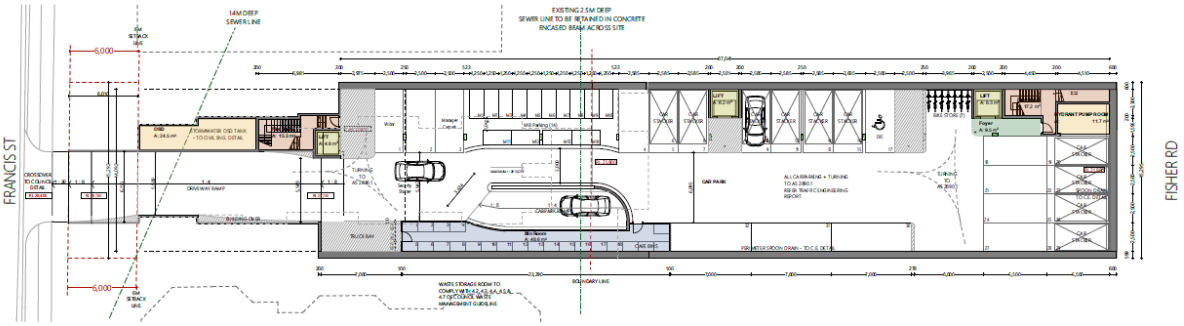
BOARDING UNITS

G	4 (+ 1 Manager)
L1	21
L2	21
L3	21
L4	13
	80 (+ 1 Manager)

	INTERNAL ROOM AREA	COMMON ROOMS	LIFTS	STAIRS	DECKS	TOTALS (INC. WALLS)
LOWER BASEMENT LEVEL	579.5	0	12.4	22.9	0	614.8
BASEMENT LEVEL	953.9	0	17.2	28.6	0	999.7
GROUND LEVEL FISHER	511.4	0	14.5	35.3	0	561.2
LEVEL 1 FISHER	458.6	51.5	14.4	19.4	55	598.9
LEVEL 2 FISHER	445	51.5	14.4	19.4	32.2	562.5
LEVEL 3 FISHER	445	51.5	14.4	19.4	8.4	538.7
LEVEL 4 FISHER	445	51.5	14.4	19.4	8.4	538.7
ROOF LEVEL FISHER	181.3	0	7.4	8.4	0	197.1
GROUND LEVEL FRANCIS	198.9	0	4.8	22.1	0	225.8
LEVEL 1 FRANCIS	233.6	0	4.8	9.8	4.5	252.7
LEVEL 2 FRANCIS	233.5	0	4.8	9.8	3.8	251.9
LEVEL 3 FRANCIS	233.5	0	4.8	9.8	3.8	251.9
						5,593.9

DEVELOPMENT STATISTICS

ZONE	B4 Mixed use
DP	Lot 28 and 40 On DP 7413
Site Area	1391.2m² (2 X 695.6m²)
Council	Northern Beaches
Unit Nos	80 Units + Manager
Area of Building	5,784.20m²
Communal Garden	213.25m²
Landscape Area	339.50m² (24%)
FSR DELIVERED	2.4 m² (Combined)
Car Parking	60 Spaces, including 2 Disabled carparks



PROPOSED LOWER LEVEL PLAN

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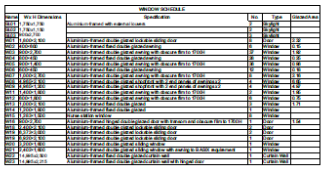

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ISSUE	AMENDMENT DETAILS	DATE
CD	CONCEPT DESIGN	28.11.19
DA	PRE DEVELOPMENT APPLICATION	15.04.20
DA	DEVELOPMENT APPLICATION	12.08.20

GENERAL NOTES
BUILDER TO CHECK AND VERIFY ALL DIMENSIONS, LEVELS AND ANGLES ON SITE PRIOR TO COMMENCEMENT OF WORK AND/OR MANUFACTURED COMPONENTS
ALL WORKS TO CONFORM WITH ALL BCA AND OTHER RELEVANT AUTHORITY REQUIREMENTS.

SCALE	As shown
DRAWN	K.VA
DATE	AUGUST 2020
CHECKED	Phillip.G
STAGE	DA

CLIENT / ADDRESS
28 FISHER RD + 9 FRANCIS ST
DEE WHY, NSW, 2099,
AUSTRALIA
PROJECT
MIXED-USE COMMUNITY CENTRE

DRAWING TITLE
PROPOSED
LOWER LEVEL

DRAWING NO. AMENDMENT
4869A.2 DA

NOTES

ALL CARPARKING SPACES TO CONFORM WITH AS 2890.1 @ 2500mm x 5400mm

SEPP 0.5/unit x 80	= 40 spaces
Manager	= 1 spaces
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Church	= 16 spaces
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BOARDING UNITS

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L1	21
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L3	21
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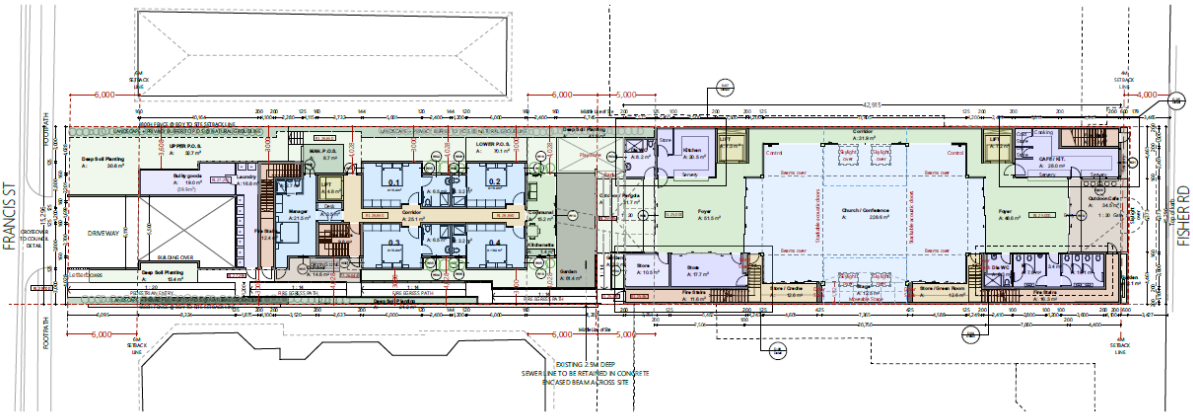
	INTERNAL ROOM AREA	COMMON ROOMS	LIFTS	STAIRS	DECKS	TOTALS (INC. WALLS)
LOWER BASEMENT LEVEL	579.5	0	12.4	22.9	0	614.8
BASEMENT LEVEL	953.9	0	17.2	28.6	0	999.7
GROUND LEVEL FISHER	511.4	0	14.5	35.3	0	561.2
LEVEL 1 FISHER	458.6	51.5	14.4	19.4	55	598.9
LEVEL 2 FISHER	445	51.5	14.4	19.4	32.2	562.5
LEVEL 3 FISHER	445	51.5	14.4	19.4	8.4	538.7
LEVEL 4 FISHER	445	51.5	14.4	19.4	8.4	538.7
ROOF LEVEL FISHER	181.3	0	7.4	8.4	0	197.1
GROUND LEVEL FRANCIS	198.9	0	4.8	22.1	0	225.8
LEVEL 1 FRANCIS	233.6	0	4.8	9.8	4.5	252.7
LEVEL 2 FRANCIS	233.5	0	4.8	9.8	3.8	251.9
LEVEL 3 FRANCIS	233.5	0	4.8	9.8	3.8	251.9
						5,593.9

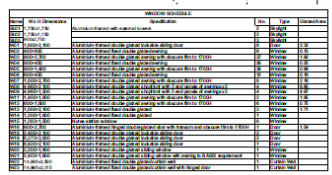
DEVELOPMENT STATISTICS

ZONE	B4 Mixed use
DP	Lot 28 and 40 On DP 7413
Site Area	1391.2m² (2 X 695.6m²)
Council	Northern Beaches
Unit Nos	80 Units + Manager
Area of Building	5,784.20m²
Communal Garden	213.25m²
Landscape Area	339.50m² (24%)
FSR DELIVERED	2.4 m² (Combined)
Car Parking	60 Spaces, including 2 Disabled carparks



PROPOSED GROUND LEVEL PLAN

1:250 @ A3



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The George Group Pty Ltd
ABN 11 075 939 847
Level 1, 335 MONA VALE RD, TERREY HILLS, NSW, Australia, 2084

ISSUE	AMENDMENT DETAILS	DATE
CD	CONCEPT DESIGN	28.11.19
DA	PRE DEVELOPMENT APPLICATION	15.04.20
DA	DEVELOPMENT APPLICATION	12.08.20

GENERAL NOTES
BUILDER TO CHECK AND VERIFY ALL DIMENSIONS, LEVELS AND ANGLES ON SITE PRIOR TO COMMENCEMENT OF WORK AND/OR MANUFACTURED COMPONENTS
ALL WORKS TO CONFORM WITH ALL BCA AND OTHER RELEVANT AUTHORITY REQUIREMENTS.

SCALE	As shown
DRAWN	K.VA
DATE	AUGUST 2020
CHECKED	Phillip.G
STAGE	DA

CLIENT / ADDRESS
28 FISHER RD + 9 FRANCIS ST
DEE WHY, NSW, 2099,
AUSTRALIA
PROJECT
MIXED-USE COMMUNITY CENTRE

DRAWING TITLE
PROPOSED
GROUND LEVEL

DRAWING NO. AMENDMENT
4869A.3 DA

NOTES

ALL CARPARKING SPACES TO CONFORM WITH AS 2890.1 @ 2500mm x 5400mm

SEPP 0.5/unit x 80	= 40 spaces
Manager	= 1 spaces
Cafe	= 3 spaces
Church	= 16 spaces
	= 60 spaces
Motorcycle Parking	= 16 spaces (80 / 5 = 16)
Bicycle Parking	= 16 spaces (80 / 5 = 16)

BOARDING UNITS

G	4 (+ 1 Manager)
L1	21
L2	21
L3	21
L4	13
	80 (+ 1 Manager)

	INTERNAL ROOM AREA	COMMON ROOMS	LIFTS	STAIRS	DECKS	TOTALS (INC WALLS)
LOWER BASEMENT LEVEL	579.5	0	12.4	22.9	0	614.8
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DEVELOPMENT STATISTICS

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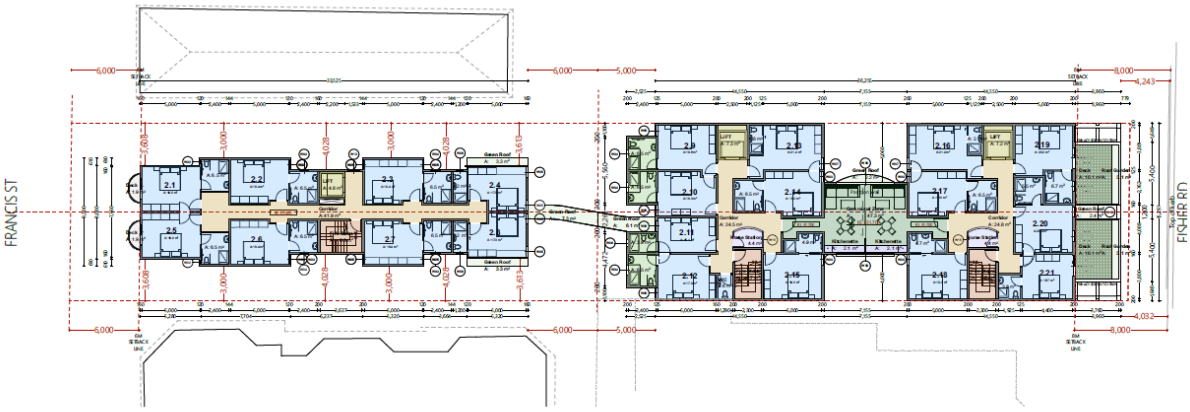

PROPOSED LEVEL 2 PLAN

1:250 @ A3

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ISSUE	AMENDMENT DETAILS	DATE
CD	CONCEPT DESIGN	28.11.18
DA	PRE DEVELOPMENT APPLICATION	15.04.20
DA	DEVELOPMENT APPLICATION	13.08.20

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SCALE	As shown
DRAWN	K.VA
DATE	AUGUST 2020
CHECKED	Philip.G
STAGE	DA

CLIENT / ADDRESS
28 FISHER RD + 9 FRANCIS ST DEE WHY, NSW, 2099, AUSTRALIA
PROJECT
MIXED-USE COMMUNITY CENTRE

DRAWING TITLE
PROPOSED LEVEL 2
DRAWING NO 4969/1.5
AMENDMENT DA

NOTES

ALL CARPARKING SPACES TO CONFORM WITH AS 2890.1 @ 2500mm x 5400mm

SEPP 0.5/unit x 80	= 40 spaces
Manager	= 1 spaces
Cafe	= 3 spaces
Church	= 16 spaces
	= 60 spaces
Motorcycle Parking	= 16 spaces (80 / 5 = 16)
Bicycle Parking	= 16 spaces (80 / 5 = 16)

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L2	21
L3	21
L4	13
	80 (+ 1 Manager)

	INTERNAL ROOM AREA	COMMON ROOMS	LIFTS	STAIRS	DECKS	TOTALS (INC WALLS)
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						5,593.9

DEVELOPMENT STATISTICS

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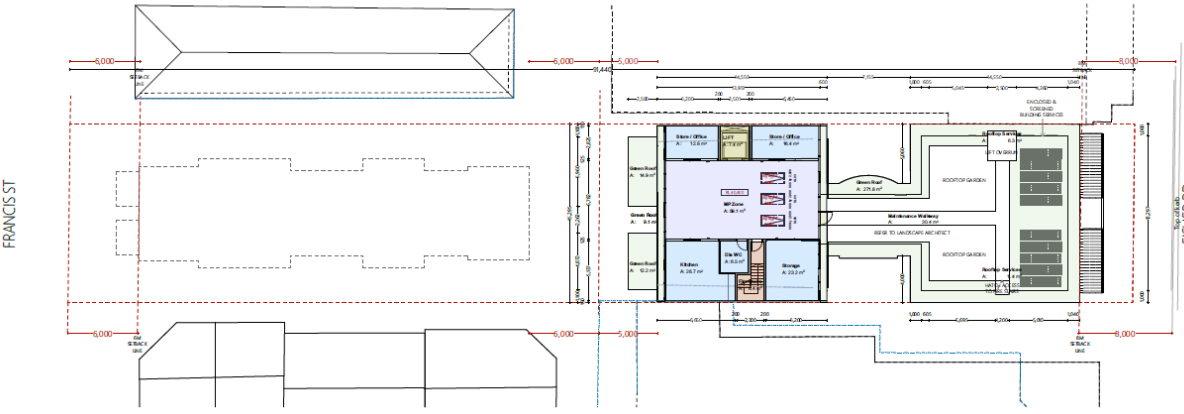

PROPOSED ROOFTOP LEVEL PLAN

1:250 @ A3

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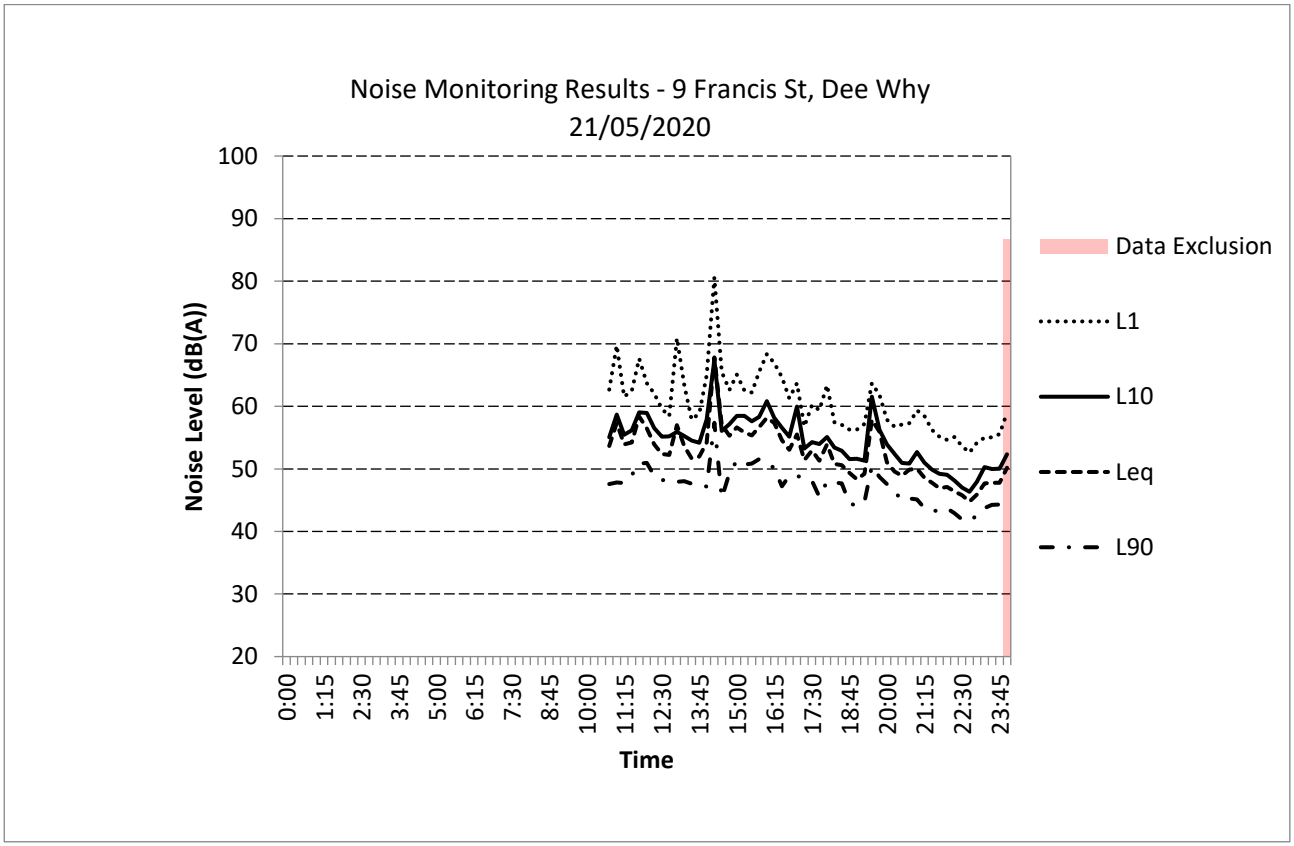
DRAWN	K.VA
DATE	AUGUST 2020
CHECKED	Philip.G
STAGE	DA

CLIENT / ADDRESS
28 FISHER RD + 9 FRANCIS ST DEE WHY, NSW, 2099, AUSTRALIA
PROJECT
MIXED-USE COMMUNITY CENTRE

DRAWING TITLE
PROPOSED ROOFTOP LEVEL
DRAWING NO 4969/1.6
AMENDMENT DA

Appendix B Noise Monitoring Graphs


Noise Monitoring Results - 9 Francis St, Dee Why
21/05/2020
Noise Level (dB(A))
100
90
80
70
60
50
40
30
20
0:00
1:15
2:30
3:45
5:00
6:15
7:30
8:45
10:00
11:15
12:30
13:45
15:00
16:15
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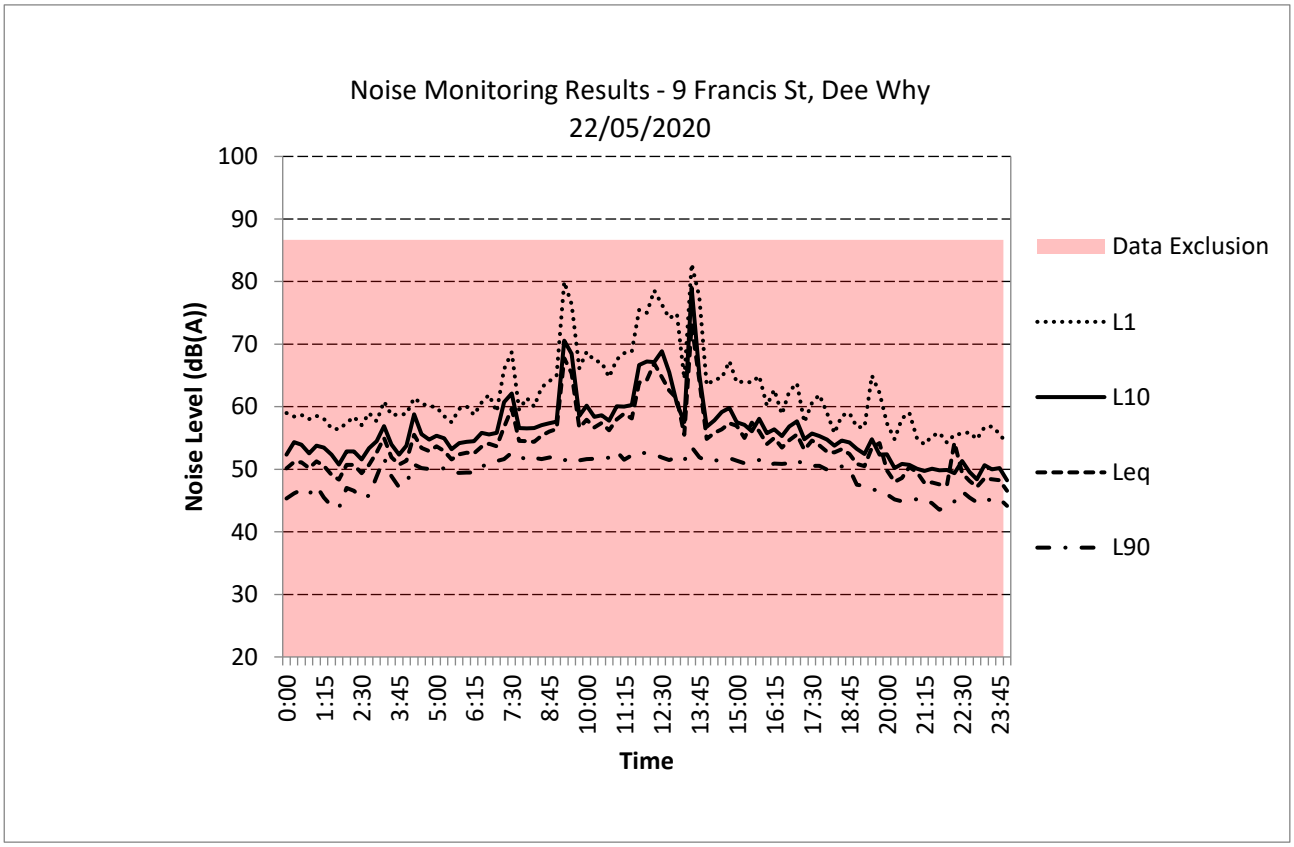
18:45
20:00
21:15
22:30
23:45
Time
Data Exclusion
L1
L10
Leq
L90


Noise Monitoring Results - 9 Francis St, Dee Why
22/05/2020
Noise Level (dB(A))
100
90
80
70
60
50
40
30
20
0:00
1:15
2:30
3:45
5:00
6:15
7:30
8:45
10:00
11:15
12:30
13:45
15:00
16:15
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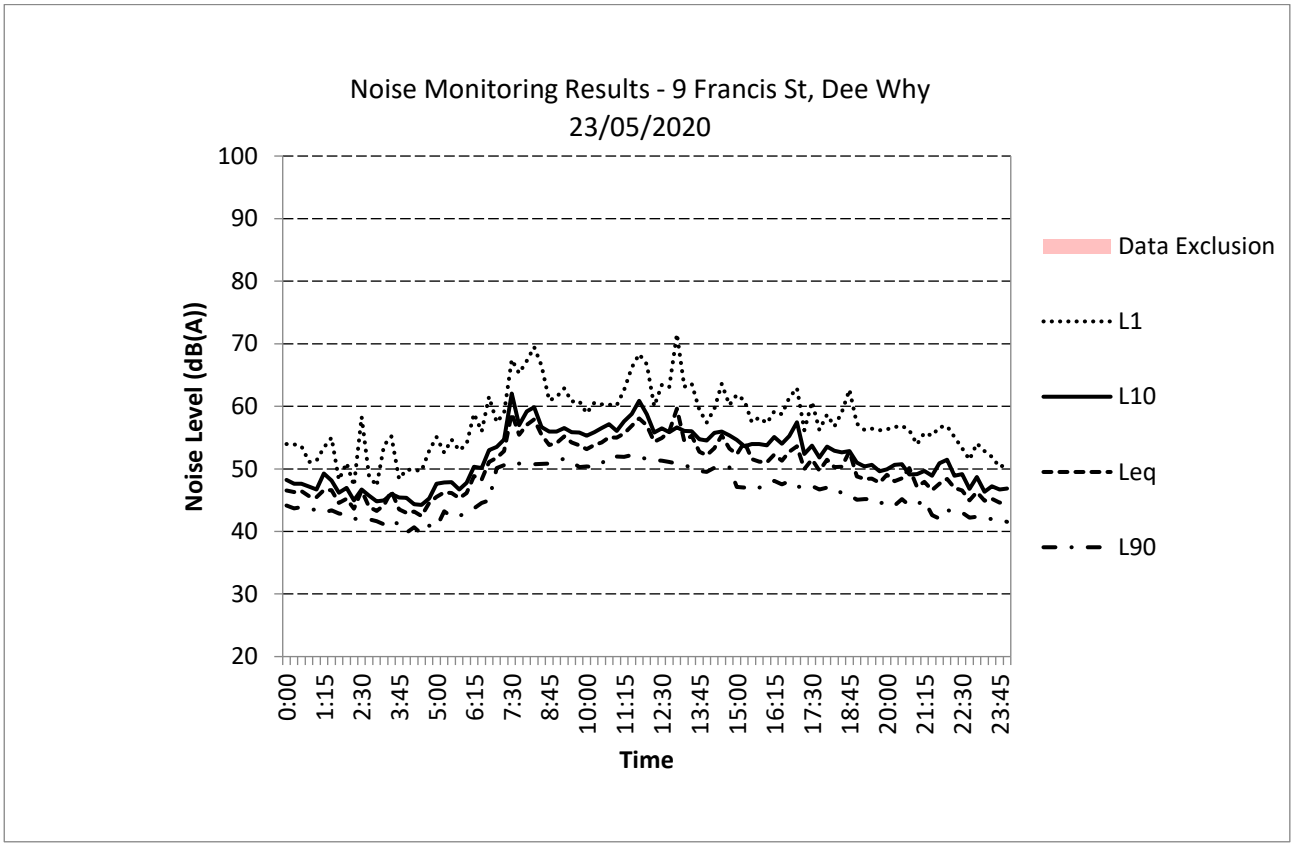
18:45
20:00
21:15
22:30
23:45
Time
Data Exclusion
L1
L10
Leq
L90


Noise Monitoring Results - 9 Francis St, Dee Why
23/05/2020
Noise Level (dB(A))
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90
80
70
60
50
40
30
20
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1:15
2:30
3:45
5:00
6:15
7:30
8:45
10:00
11:15
12:30
13:45
15:00
16:15
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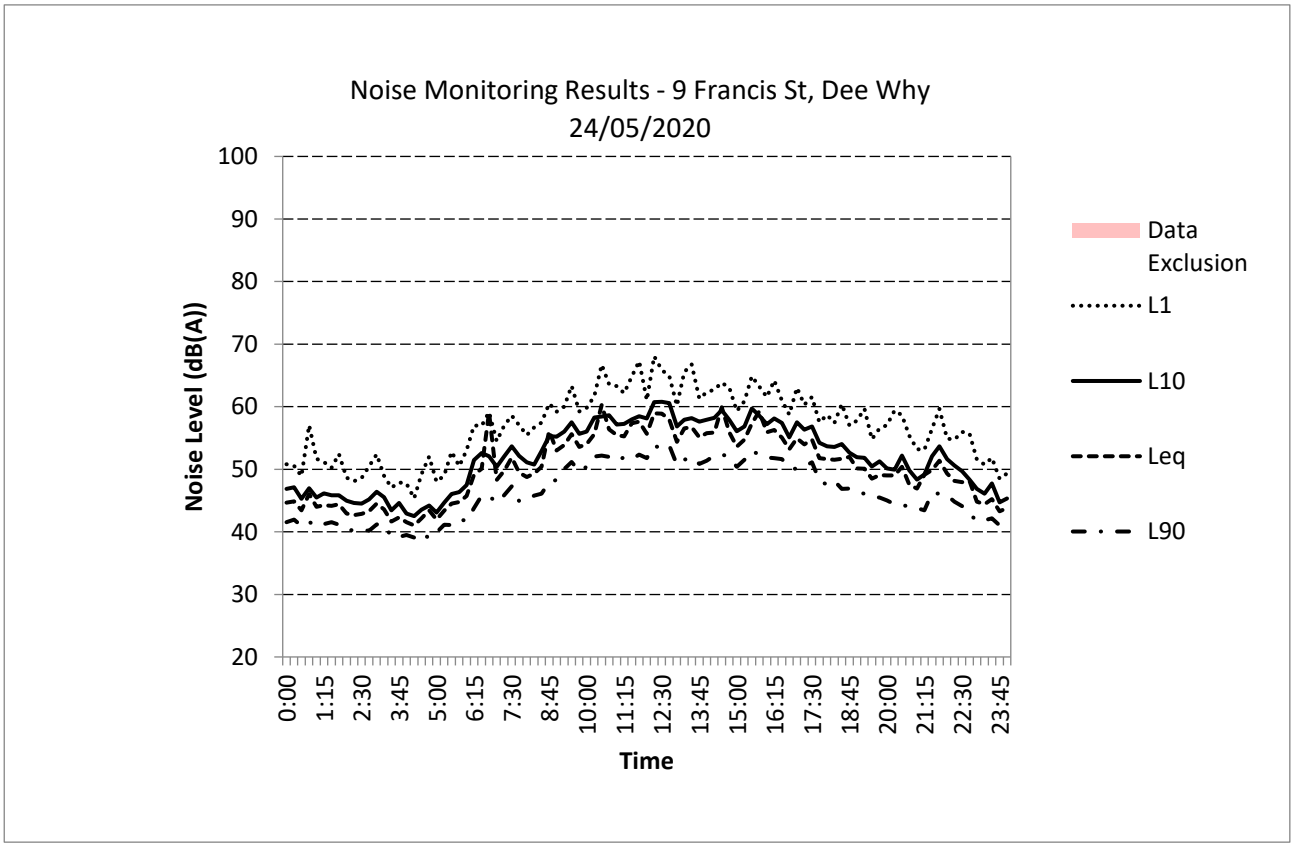
20:00
21:15
22:30
23:45
Time
Data Exclusion
L1
L10
Leq
L90


Noise Monitoring Results - 9 Francis St, Dee Why
24/05/2020
Noise Level (dB(A))
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90
80
70
60
50
40
30
20
0:00
1:15
2:30
3:45
5:00
6:15
7:30
8:45
10:00
11:15
12:30
13:45
15:00
16:15
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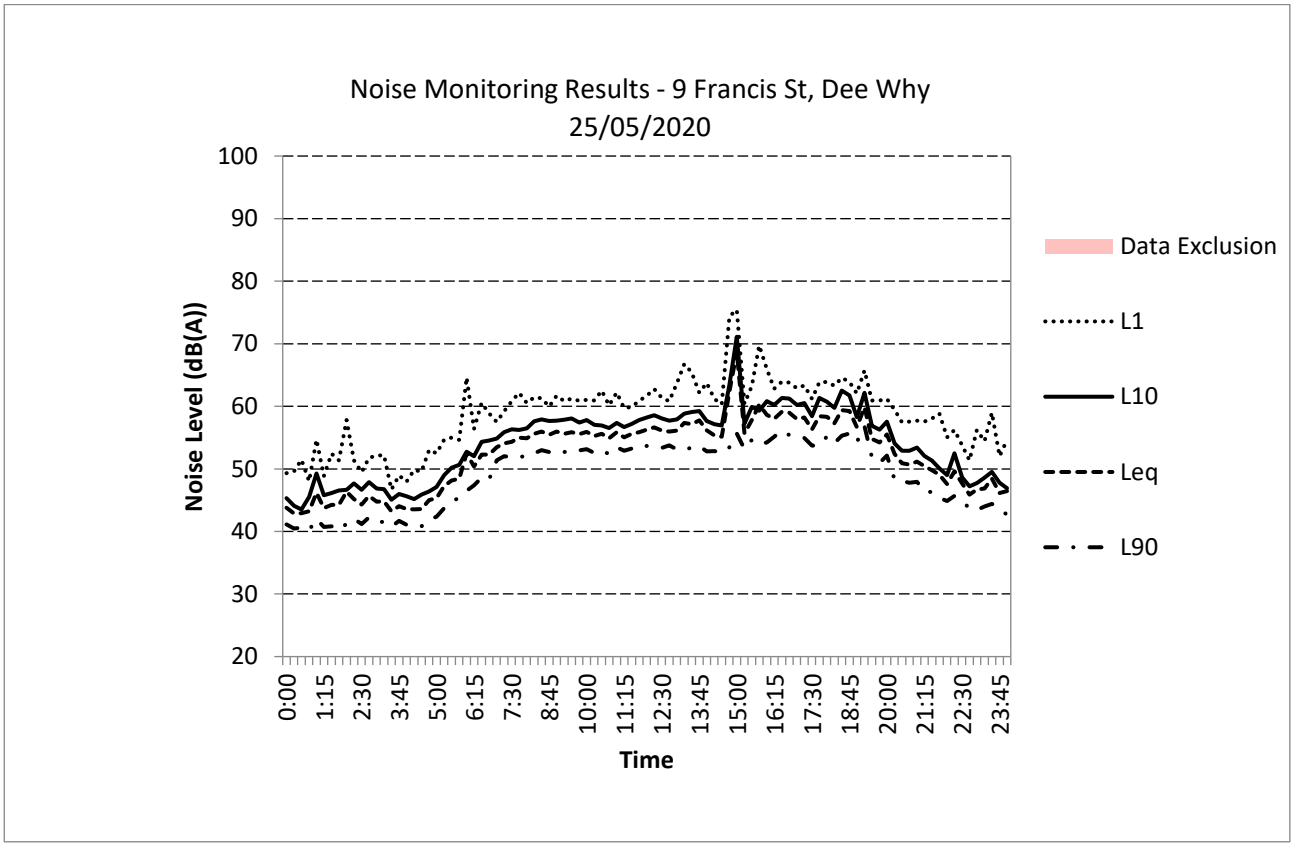
20:00
21:15
22:30
23:45
Time
Data Exclusion
L1
L10
Leq
L90


Noise Monitoring Results - 9 Francis St, Dee Why
25/05/2020
Noise Level (dB(A))
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80
70
60
50
40
30
20
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2:30
3:45
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7:30
8:45
10:00
11:15
12:30
13:45
15:00
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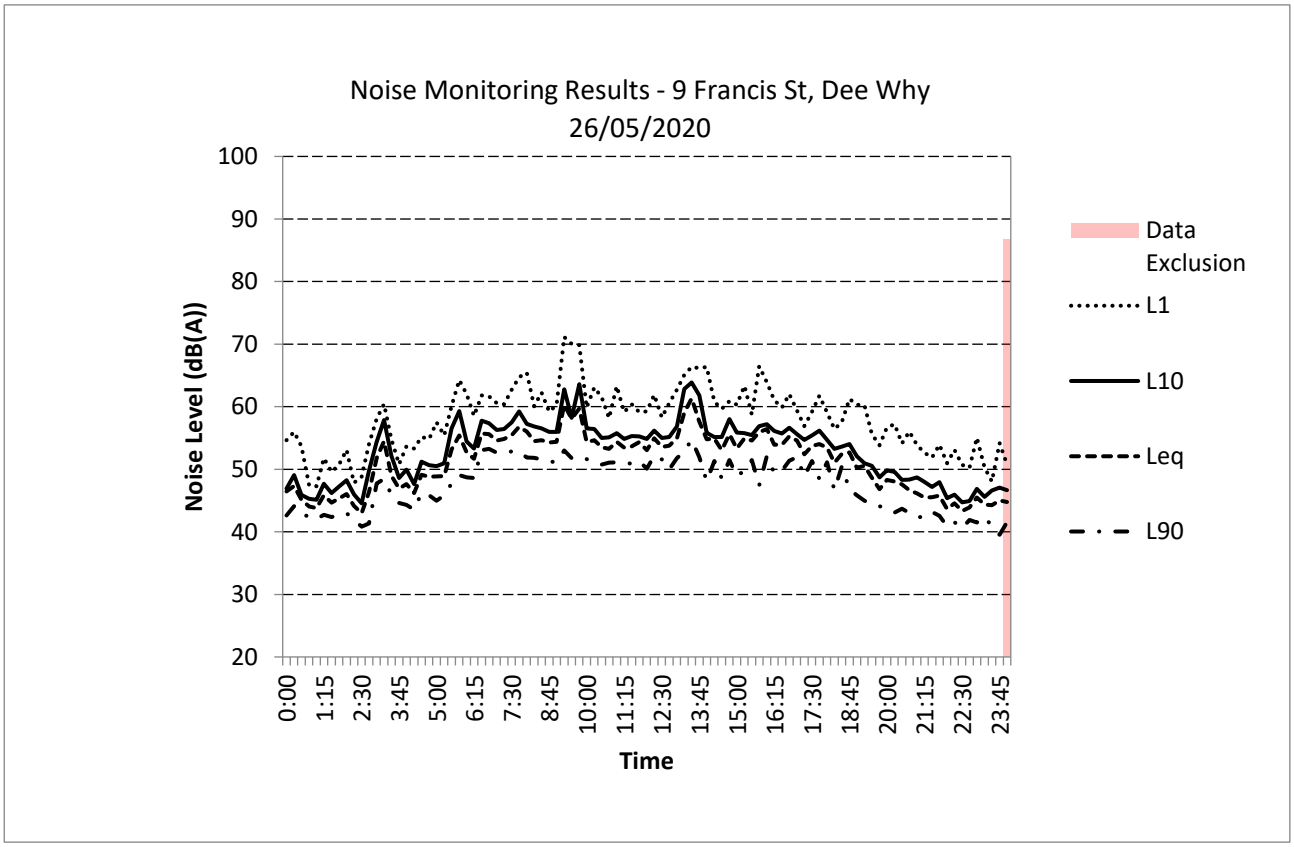
23:45
Time
Data Exclusion
L1
L10
Leq
L90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26/05/2020
Noise Level (dB(A))
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80
70
60
50
40
30
20
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10:00
11:15
12:30
13:45
15:00
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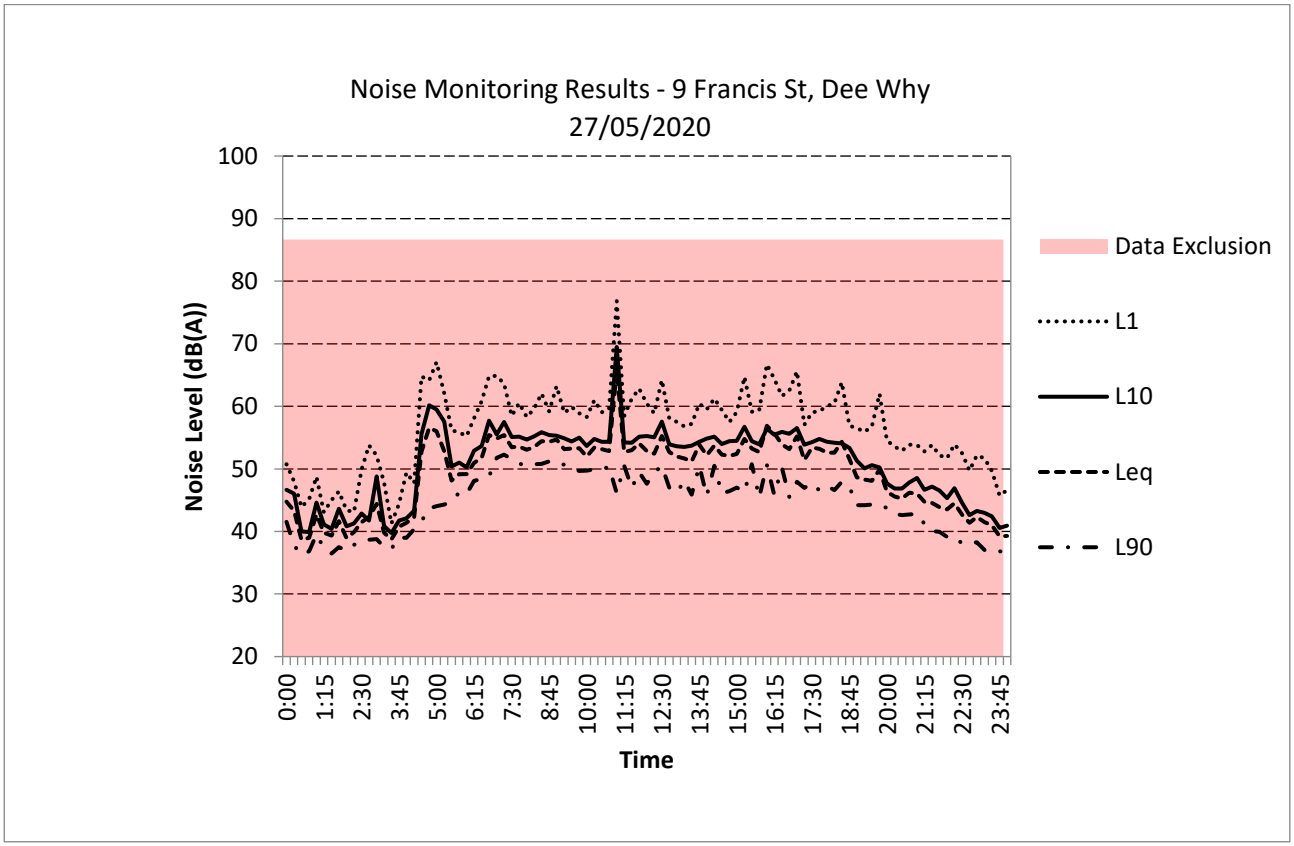
23:45
Time
Data Exclusion
L1
L10
Leq
L90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27/05/2020
Noise Level (dB(A))
100
90
80
70
60
50
40
30
20
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1:15
2:30
3:45
5:00
6:15
7:30
8:45
10:00
11:15
12:30
13:45
15:00
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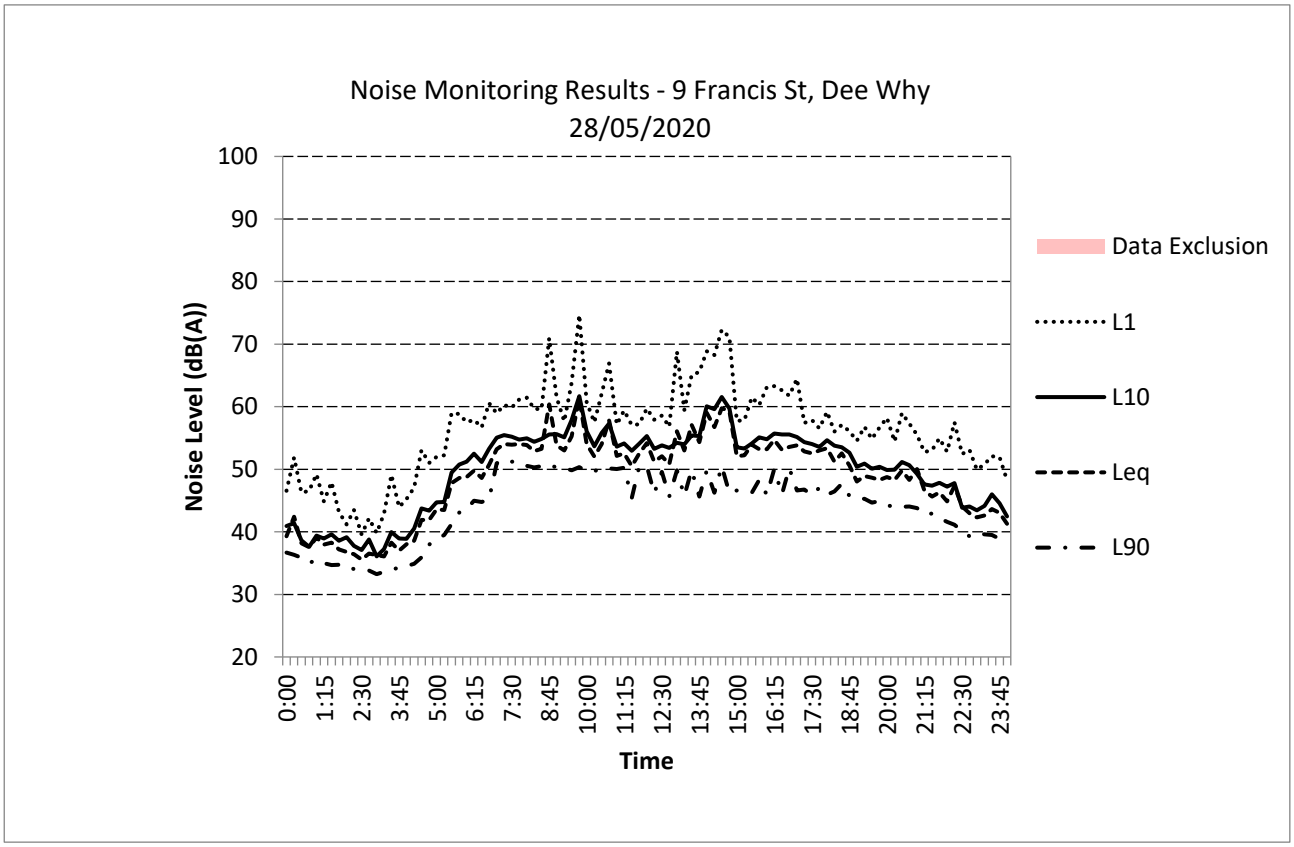
18:45
20:00
21:15
22:30
23:45
Time
Data Exclusion
L1
L10
Leq
L90


Noise Monitoring Results - 9 Francis St, Dee Why
28/05/2020
Noise Level (dB(A))
100
90
80
70
60
50
40
30
20
0:00
1:15
2:30
3:45
5:00
6:15
7:30
8:45
10:00
11:15
12:30
13:45
15:00
16:15
17:30
18:45
20:00
21:15
22:30
23:45
Time
Data Exclusion
L1
L10
Leq
L90

Appendix C Glossary

In this acoustic report unless the context of the subject matter otherwise indicates or requires, a term has the following meaning:

TERM	DEFINITION
ABL	The Assessment Background Level is the single figure background level representing each assessment period (daytime, evening and night-time (for each day). It is determined by calculating the 10th percentile (lowest 10th percent) background level (L_{A90}) for each period.
Adverse Weather	Weather effects that increases noise (i.e. wind and temperature inversion) that occurs at a site for a significant period of time (i.e. wind occurring more than 30% of the time in any assessment period in any season and / or temperature inversion occurring more than 30% of the nights in winter).
Ambient Noise	The all-encompassing noise associated within a given environment. It is the composite of sounds from many sources both near and far.
Assessment Period	The period in a day over which assessments are made: day (0700 to 1800h), evening (1800 to 2200h) or night (2200 to 0700h) or actual operating period if only a part of a period(s).
A – Weighting Filter	A-weighting is the most commonly used of a family of curves defined in the International standard IEC 61672:2003 and various national standards relating to the measurement of sound pressure level. A-weighting is applied to instrument-measured sound levels in effort to account for the relative loudness perceived by the human ear, as the ear is less sensitive to low audio frequencies.
Background Noise	The underlying level of noise present in the ambient noise, excluding the noise source under investigation, when extraneous noise is excluded. Usually described using the L90 measurement parameter.
C – Weighting Filter	The C-weighting approximates the sensitivity of human hearing at industrial noise levels (above about 85 dB(A)). The C-weighted sound level (i.e., measured with the C-weighting) is more sensitive to sounds at low frequencies than the A-weighted sound level and is sometimes used to assess the low-frequency content of complex sound environments and entertainment noise.
Decibel	The ratio of sound pressures which we can hear is a ratio of 106 (one million:one). For convenience, therefore, a logarithmic measurement scale is used. The resulting parameter is called the 'sound pressure level' (Lp) and the associated measurement unit is the decibel (dB). As the decibel is a logarithmic ratio, the laws of logarithmic addition and subtraction apply.
dB(A)	The unit generally used for measuring environmental, traffic or industrial noise is the A-weighted sound pressure level in decibels, denoted dB(A). An A-weighting network can be built into a sound level measuring instrument such that sound levels in dB(A) can be read directly from a sound level meter. The weighting is based on the frequency response of the human ear and has been found to correlate well with human subjective reactions to various sounds. It is worth noting that an increase or decrease of approximately 10 dB corresponds to a subjective doubling or halving of the loudness of a noise, and a change of 2 to 3 dB is subjectively barely perceptible.
Equivalent Continuous Sound Level (L_{eq})	Another index for assessment for overall noise exposure is the equivalent continuous sound level, L_{eq}. This is a notional steady level which would, over a given period of time, deliver the

TERM	DEFINITION
	same sound energy as the actual time-varying sound over the same period, similar to the average. Hence fluctuating levels can be described in terms of a single figure level.
Extraneous Noise	Noise resulting from activities that are not typical of the area. Atypical activities may include construction, and traffic generated during holiday periods and during special events such as concert or sporting events.
Fast Time Weighting	125 ms integration time while the signal level is increasing and decreasing.
Frequency	The rate of repetition of a sound wave. The subjective equivalent in music is pitch. The unit of frequency is the Hertz (Hz), which is identical to cycles per second. A thousand hertz is often denoted kHz, e.g. 2 kHz = 2000 Hz. Human hearing ranges approximately from 20 Hz to 20 kHz. For design purposes, the octave bands between 63 Hz to 8 kHz are generally used. The most commonly used frequency bands are octave bands, in which the mid frequency of each band is twice that of the band below it. For more detailed analysis, each octave band may be split into three one-third octave bands or in some cases, narrow frequency bands.
L_{Aeq}	See equivalent continuous sound level definition above. This is the A-weighted energy average of the varying noise over the sample period and is equivalent to the level of a constant noise which contains the same energy as the varying noise environmental. This measure is also a common measure of environmental noise and road traffic noise.
$L_{Aieq,T}$	Equivalent continuous A-weighted sound pressure level over the measurement period T with impulse time weighting.
$L_{Ceq,T}$	The equivalent continuous C-weighted sound pressure level (integrated level) that, over the measurement period T, has the same mean square sound pressure (referenced to 20 µPa) as the fluctuating sound(s) under consideration.
$L_{C, Peak}$	The C-weighted Peak sound pressure level during a designated time interval or a noise event.
Maximum Noise Levels L_{max}	The maximum noise level over a sample period is the maximum level, measured on fast response, during the sample period.
Minimum Noise Levels L_{min}	The minimum noise level over a sample period is the minimum level, measured on fast response, during the sample period.
Noise Sensitive Receiver (NSR)	A noise sensitive receiver is any person or building or outside space in which they reside or occupy that has the potential to be adversely impacted by noise from an outside source, or noise not generated by the noise sensitive receiver.
Octave Bands	Octave bands are frequency ranges in which the upper limit of each band is twice the lower limit. Octave bands are identified by their geometric mean frequency, or centre frequency.
One-Third Octave Bands	One-Third Octave Bands are frequency ranges where each octave is divided into one-third octaves with the upper frequency limit being 1.26 times the lower frequency. They are identified by the geometric mean frequency of each band, or centre frequency.

TERM	DEFINITION
Project-Specific Noise Levels	They are target noise levels for a particular noise generating facility. They are based on the most stringent of the intrusive or amenity criteria derived from the NSW Industrial Noise Policy.
RBL	The Rating Background Level for each period is the median value of the ABL values for the period over all the days measured. There is a therefore an RBL value for each period – daytime, evening and night-time.
Shoulder Periods	Where early morning (5 am to 7 am) operations are proposed, it may be unduly stringent to expect such operations to be assessed against the night-time criteria (especially if existing background noise levels are steadily rising in these early morning hours). In these situations, appropriate noise level targets may be negotiated with the regulatory/consent authority on a case-by-case basis.
Sound Level Difference (D)	The sound insulation required between two spaces may be determined by the sound level difference needed between them. A single figure descriptor, the weighted sound level difference, D_w, is sometimes used (see BS EN ISO 717-1).
Sound Power	The sound power level (L_w) of a source is a measure of the total acoustic power radiated by a source. The sound pressure level varies as a function of distance from a source. However, the sound power level is an intrinsic characteristic of a source (analogous to its volume or mass), which is not affected by the environment within which the source is located.
Statistical Noise Levels	For levels of noise that vary widely with time, for example road traffic noise, it is necessary to employ an index which allows for this variation. The L_{10}, the level exceeded for ten per cent of the time period under consideration, has been adopted in this country for the assessment of road traffic noise. The L_{90}, the level exceeded for ninety per cent of the time, has been adopted to represent the background noise level. The L_1, the level exceeded for one per cent of the time, is representative of the maximum levels recorded during the sample period. A-weighted statistical noise levels are denoted L_{A10}, dBL_{A90} etc. The reference time period (T) is normally included, e.g. $dBL_{A10, 5min}$ or $dBL_{A90, 8hr}$.
L_{A1}	The L_{A1} level is the A-weighted noise level which is exceeded for 15 of the sample period. During the sample period, the noise level is below the L_{A1} level for 99% of the time.
L_{A10}	The L_{A10} level is the A-weighted noise level which is exceeded for 10% of the sample period. During the sample period, the noise level is below the L_{A10} level for 90% of the time. The L_{A10} is a common noise descriptor for environmental noise and road traffic noise.
L_{A50}	The L_{A50} level is the A-weighted noise level which is exceeded for 50% of the sample period.
L_{A90}	The LA90 level is the noise level which is exceeded for 90% of the sample period. During the sample period, the noise level is below the LA90 level for 10% of the time. This measure is a commonly referred to as the background noise level.
Tonality	Noise containing a prominent frequency and characterised by a definite pitch.