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Noise Impact Assessment
Gosford RSL Redevelopment
West Gosford, NSW

Prepared for:

Gosford RSL c/- APP Consulting
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Document No: 171540-7699-R2

March 2018

Project name:	Gosford RSL Redevelopment
Prepared for:	APP
Client representative:	Brendan Fisher
Document control number:	171540-7699
Approved for release by:	N. Pennington

DOCUMENT CONTROL				
Doc. No. / Version	**Date Issued**	**Prepared by**	**Reviewed by**	**Issued to**
171540-7699-R2	23 March 2018	N. Pennington	R. Hodge	B. Fisher
171540-7699-R1	21 March 2018	N. Pennington	R. Hodge	B. Fisher
171540-7699-R0	20 March 2018	N. Pennington	R. Hodge	B. Fisher

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EXECUTIVE SUMMARY

A Noise Impact Assessment (NIA) for the operation of the proposed redevelopment of the Gosford RSL Club, West Gosford, NSW has been conducted. The various demolition and construction activities will be subject to Construction Noise Management Plans that will be developed during the design documentation phase and would be required in a Project Approval, should such approval be given by Central Coast Council.

The assessment has yielded the following findings and recommendations:

- There are no predicted adverse noise emissions from outdoor terrace areas;
- There are no predicted adverse noise emissions from music within the proposed function room;
- Mechanical plant will require final assessment of sound power and placement to ensure compliance with the night time noise criterion at the Yallambee Lodge retirement living complex.

Based on the results of this assessment, it is our professional opinion that adoption of the recommendations within this report will result in compliance with noise conditions as may be imposed by Council in a development consent.

1.0 INTRODUCTION

1.1 The Proposal

APP Consulting (APP) has commissioned Spectrum Acoustics to prepare a Noise Impact Assessment (NIA) for a proposed redevelopment of the Gosford RSL Club, West Gosford, NSW. This study was commissioned to accompany a Development Application to Central Coast Council.

1.2 Project Description

The proposal is to construct a new RSL Club on existing car parking space adjacent to the Central Coast Highway, then to demolish the existing Club and utilise the space for additional car parking. Under the proposal there would be ground level under cover parking, utility spaces and an entry foyer off Yallambee Avenue, first floor level lounge, bistro and café areas with an outdoor terrace and second floor restaurant, sports bar and function spaces.

The development footprint adjoins the Galaxy Motel (situated on the same site), also owned by Gosford RSL, and a retirement living development called Yallambee Lodge. Potential noise impacts from operation of the proposal on Yallambee Lodge require assessment as this is the nearest non-project related residential use. Short term noise impacts from construction and demolition activities will be addressed in a Construction Noise Management Plan.

1.3 Description of Terms

Table 1 contains the definitions of commonly used acoustical terms and is presented as an aid to understanding this report.

Table 1: Definition of acoustical terms

Term	Definition
dB(A)	The quantitative measure of sound heard by the human ear, measured by the A-Scale Weighting Network of a sound level meter expressed in decibels (dB).
SPL	Sound Pressure Level. The incremental variation of sound pressure above and below atmospheric pressure and expressed in decibels. The human ear responds to pressure fluctuations, resulting in sound being heard.
STL	Sound Transmission Loss. The ability of a partition to attenuate sound, in dB.
Lw	Sound Power Level radiated by a noise source per unit time re 1pW.
Leq	Equivalent Continuous Noise Level - taking into account the fluctuations of noise over time. The time-varying level is computed to give an equivalent dB(A) level that is equal to the energy content and time period.
L1	Average Peak Noise Level - the level exceeded for 1% of the monitoring period.
L10	Average Maximum Noise Level - the level exceeded for 10% of the monitoring period.

L90	Average Minimum Noise Level - the level exceeded for 90% of the monitoring period and recognised as the Background Noise Level. In this instance, the L90 percentile level is representative of the noise level generated by the surrounds of the residential area.

2.0 NOISE ASSESSMENT

2.1 Ambient Noise Levels

Ambient noise levels were measured on the existing Galaxy Motel site from 5-11 February 2018 using a Rion NL-42 environmental noise logger. The measurements were conducted in accordance with relevant EPA guidelines and AS 1055-1997 "Acoustics – Description and Measurement of Environmental Noise". The noise logger used complies with the requirements of AS 1259.2-1990 "Acoustics – Sound Level Meters", and has current NATA calibration certification.

The logger was programmed to continuously register environmental noise levels over the 15 minute intervals, with internal software calculating and storing Ln percentile noise levels for each sampling period. Calibration of the logger was performed as part of the instrument's initialisation procedures, with calibration results being within the allowable $\pm$ 0.5 dB(A) range.

The logger was located on a small skillion roof on the northern side of the Motel reception building as shown in **Figure 1**.

Figure 1: Site location and logger location

Ambient L_{Aeq} and background (L_{A90}) noise levels obtained from the logger are summarised below in **Table 2** and shown graphically in **Appendix A**. Table 1 includes the background (L90) levels, the Leq over the full day (11 hour, 7am-6pm), evening (4 hour, 6pm-10pm) and night (9 hour, 10pm-7am) periods.

Table 2: Measured ambient noise levels

Location	Day	Evening	Night
Galaxy Motel	52 dB(A) L90	51 dB(A) L90	41 dB(A) L90
	64 dB(A) Leq (11hr)	63 dB(A) Leq (4hr)	57 dB(A) Leq (9hr)

2.2 Noise criteria

2.2.1 Music and patron noise

Premises which are licensed under the Liquor Act may be a source of offensive noise for neighbouring residents as a result of activities on the premises, or the activity of patrons arriving and departing.

The Police Department, Independent Liquor and Gaming Authority (ILGA) and EPA have agreed that the ILGA will accept primary responsibility for the control of noise from licensed premises. Following are the Standard Noise Conditions imposed by ILGA;

"The LA10 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 7.00 a.m. and 12.00 midnight at the boundary of any affected residence.

The LA10 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 7.00 a.m. 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 a.m."

ILGA criteria specifically relate to noise in octave band centre frequencies. In order to accurately assess the potential impacts of noise from patron activity, frequency spectral data were taken from attended noise surveys archived in the Spectrum Acoustics technical database.

The database contains background noise levels measured in similar acoustic environments, in octave bands, with a Bruel & Kjaer Type 2260 Precision Sound analyser. This instrument has Type 1 characteristics as defined in AS1259-1982 "Sound Level Meters". Calibration of the instrument was confirmed with a Bruel & Kjaer Type 4231 Sound Level Calibrator prior to, and at the completion of measuring.

The background noise level used in this assessment for setting the ILGA criteria has been derived by adjusting a typical background octave band spectrum to match the night time background L90 level from the unattended logger. This will represent the worst case trading hours of 10pm – midnight.
By assessing potential impacts against the most stringent night time criterion, compliance here will automatically imply compliance at all other times.

The adopted background noise level and ILGA criteria for assessing noise emission from the proposed modification are shown in **Table 3**.

Table 3: Measured noise level and OLGR criteria

		Octave Band Centre Frequency, Hz								
	dB(A)	31.5	63	125	250	500	1k	2k	4k	8k
L_{90}	41	21	28	31	33	34	35	32	32	30
ILGA	46	26	33	36	38	39	40	37	37	35

2.2.2 Mechanical Plant

The proposal is not industrial in nature, but Council usually applies the "background + 5 dB" criterion for assessment of noise impacts. The measured night time background noise level (RBL) was 41 dB(A),L_{90} which implies an intrusiveness noise trigger level of 46 dB(A),$L_{eq(15min)}$ in accordance with the NSW Noise Policy for Industry (NPI) for assessment of noise impacts from mechanical plant on existing residential receivers in the area.

3.0 NOISE IMPACT ASSESSMENT

3.1 Music and patron noise

The major sources of noise were considered to be that of patrons, talking loudly and simultaneously in the outdoor terrace areas and live or recorded music in the function room.

The outdoor terrace closest to Yallambee Lodge is shown in Figure 2 and was assumed capable of holding 20 patrons, although on many occasions it will likely be used by fewer than this.

For calculations of the worst case it has been assumed that of the maximum 20 people approximately 25%, or 5 people, will at any one time be conversing loudly to constitute an L10. (Note: There may be more than 8 patrons present, however it is not anticipated that no more than this will have their voices raised simultaneously to constitute an L10 noise level). The adopted Lw dB(A), as an L10, of 8 people speaking loudly on the terrace is shown in **Table 4**.

Also listed is the LA10 sound pressure level spectrum previously measured by Spectrum Acoustics inside a wedding function room over a half-hour period at a location within 2m of the speakers.

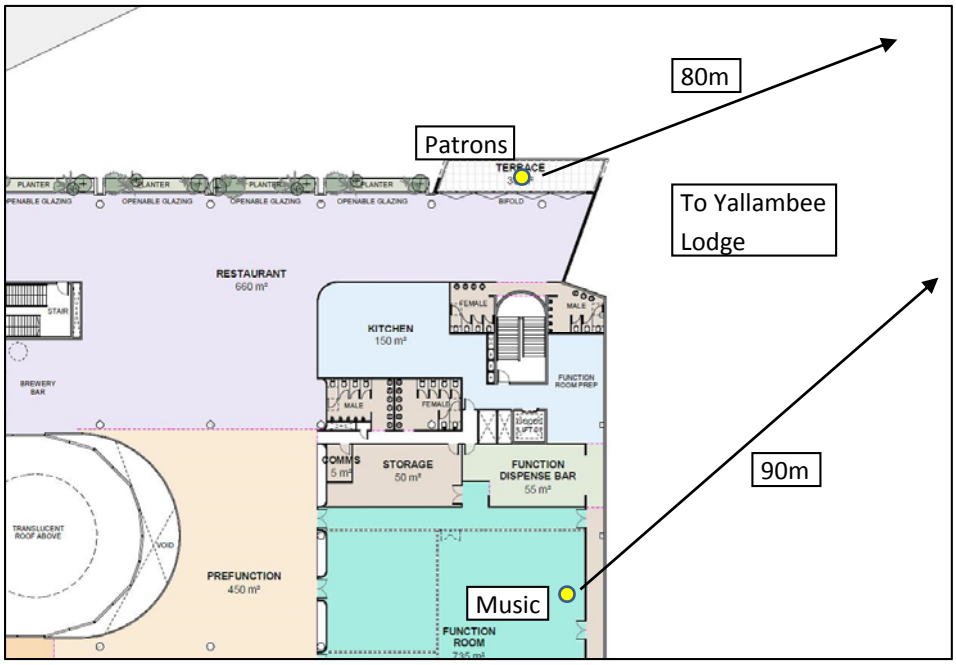


Figure 2: Noise source locations

Table 4: Noise source data

		Octave Band Centre Frequency, Hz								
	dB(A)	32	63	125	250	500	1k	2k	4k	8k
Raised speech, Lw	80	27	34	50	62	73	74	71	67	52
Music, SPL	90	49	55	68	75	82	84	83	77	69

Distance loss over the 80m from the outdoor terrace to the nearest point of Yallambee Lodge results in a calculated level of 34 dB(A). This is 12 dB below the adopted criterion of 46 dB(A).

Table 5 shows the noise emission calculation from music within the function room to the nearest point of Yallambee Lodge. The floor plans show the function room completely contained within the floor space with a corridor separating it from the building facade. Each partition, the function room wall and the facade, is assumed to provide a modest 30 dB sound transmission loss.

Table 5: Calculated music noise level

		Octave Band Centre Frequency, Hz								
	dB(A)	32	63	125	250	500	1k	2k	4k	8k
Music, SPL	90	49	55	68	75	82	84	83	77	69
Wall STL		15	18	21	24	27	30	30	30	30
Facade STL		15	18	21	24	27	30	30	30	30
External SPL	33	19	19	26	27	28	24	23	17	9
Receiver SPL[1]	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
ILGA Criterion	46	26	33	36	38	39	40	37	37	35

The calculated noise level from music in the function room is well below the ILGA criterion. Having regard to these findings no additional measures or modifications to the design are required to mitigate noise associated with patron or music / function noise.

3.2 Mechanical Plant

For a typical combination of rooftop commercial A/C condenser units, exhaust fans and refrigeration plant, a sound power level 90 dB(A) would be expected. A minimum setback distance of 36m is required to achieve the night time criterion of 46 dB(A). This is approximately half the shortest distance between the proposed new Club and Yallambee Lodge so no adverse noise impacts are expected.

The carpark exhaust fans are likely to be located at carpark level and could easily be placed so as to no pose any noise impact potential at off-site receivers. Compliance with noise criteria for external mechanical plant is generally achievable and the final mechanical plant specification and placement should be reviewed by an acoustical consultant and certified as part of the construction certification process.

3.3 Loading Dock

The loading dock would be located at ground level as shown in **Figure 3**. A typical reverse alarm on a road-going truck has a sound power level of 97 dB(A),Lmax.

[1] Bies, D. & and Hansen, C., *Engineering Noise Control*, Eq (1.107), 1996.

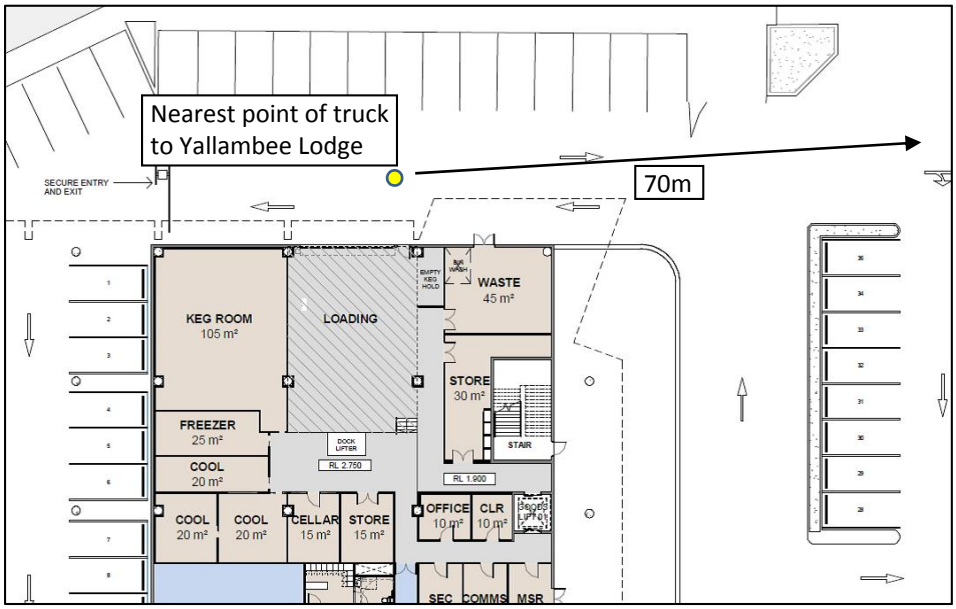


Figure 3: Loading dock

Taking into account distance loss for 70m to Yallambee Lodge, the predicted Lmax level of 52 dB(A) is 4 dB below the EPA's night time maximum noise level criterion of 56 dB(A),L_{max}. Given the orientation of the truck path in Figure 3 relative to the Yallambee Lodge site, the truck body would significantly shield the noise from the rear-facing reverse alarm and even lower noise levels would occur in practice.

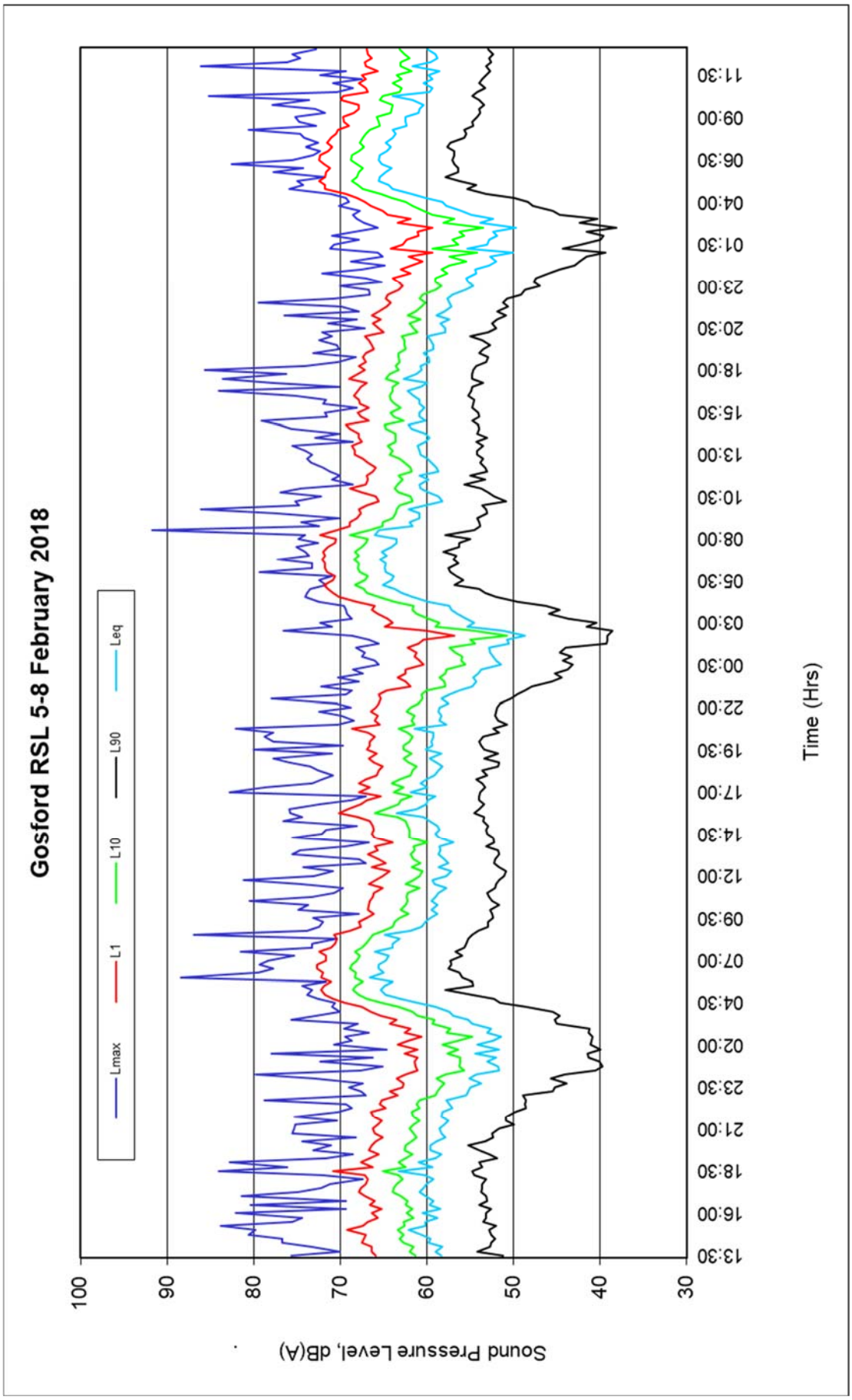
On this basis no specific mitigation measures or operational limitations are required on the use of the loading dock.

3.4 Construction Noise

The demolition and construction phases of the project would be conditioned in the project approval to be fully assessed against the EPA's Interim Construction Noise Guidelines (ICNG, 2009) and a Construction Noise Management Plan developed and implemented.

APPENDIX A

NOISE LOGGER DATA


Gosford RSL 5-8 February 2018
Lmax
L1
L10
L90
Leq
Sound Pressure Level, dB(A)
100
90
80
70
60
50
40
30
Time (Hrs)
13:30
16:00
18:30
21:00
23:30
02:00
04:30
07:00
09:30
12:00
14:30
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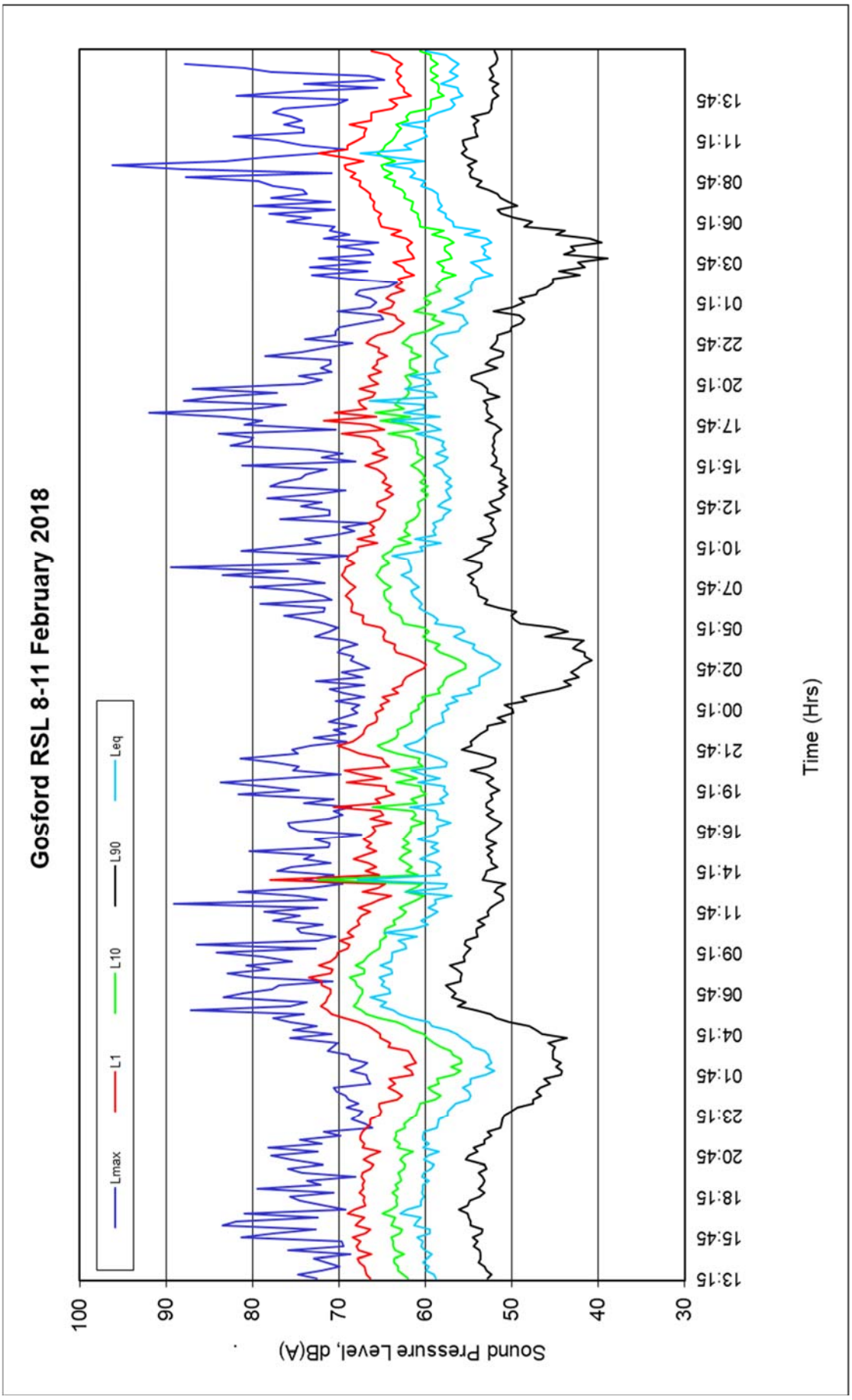
Gosford RSL 8-11 February 2018
Lmax
L1
L10
L90
Leq
Sound Pressure Level, dB(A)
100
90
80
70
60
50
40
30
Time (Hrs)
13:15
15:45
18:15
20:45
23:15
01:45
04:15
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