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DELIVERING SOUND ADVICE

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ACOUSTICAL REPORT

PROPOSED NEW MECHANICAL PLANT

14 SOUTH STEYNE, MANLY NSW

Date: Friday, 1st April 2022

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V1	10/03/2021	PD	NK	Report version 1 available for issue
V2	01/04/2022	MJ	NK	Report version 2 available for issue

Approved by	Nick Koikas M.A.A.S Principal Consultant
Client	Stephen Hayes C/o U+I Building Studio Attention: Ines Klein - ines@uibuildingstudio.com

The information contained herein should not be reproduced except in full. The information provided in this report relates to acoustic matters only. Supplementary advice should be sought for other matters relating to construction, design, structural, fire-rating, waterproofing, and the like.

ACOUSTICAL REPORT

PROPOSED NEW MECHANICAL PLANT

14 SOUTH STEYNE, MANLY NSW

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1.0 INTRODUCTION

Koikas Acoustics Pty Ltd was engaged by U+I Building Studio to prepare a noise impact assessment for the proposed development at 14 South Steyne, Manly seeking approval for the alterations and additions to an existing commercial premise that will result in the construction of a new rooftop mechanical plant area.

For the DA proposal, the acoustic adequacy of the proposed design must be assessed in terms of standard planning guidelines issued by Northern Beaches Council in their Local Environment Plan (LEP) and Development Control Plan (DCP), and also in terms of other standard planning guidelines related to common sources of noise.

In accordance with Council guidelines and other standard planning instruments, Koikas Acoustics has determined that mechanical plant noise emission from the proposed development to neighbouring dwellings requires an assessment at the current DA stage.

This report presents the results and findings of an acoustical assessment for the subject proposal. In-principle acoustic treatments and noise control recommendations are included (where required) so that the premises may operate in compliance with the nominated acoustic planning levels.

2.0 THE PROPOSAL

The development is proposed for the existing commercial site at 14 South Steyne, Manly.

The application is for alterations and additions to the existing structure that will result in a new mechanical plant system and waste storage area. The current development design can be seen in architectural drawings as prepared by U+I Building Studio, detailed in Table 1. All calculations and noise modelled scenarios conducted for this assessment are referenced to these architectural drawings.

Table 1. Design drawings used in the assessment

Drawing Title	Drawing No.	Revision	Date	Job No.
Proposed Ground Floor Plan	DA10	E	14/02/2022	-
Proposed First Floor Plan	DA11	E	14/02/2022	-
Proposed Roof Plan	DA12	F	14/02/2022	-
Proposed Elevation	DA30	F	14/02/2022	-
Proposed Elevations	DA31	F	14/02/2022	-

Notes
1. Detailed above are the plans and drawings available at the time of assessment. Where design changes are made without the prior knowledge of Koikas Acoustics, the assessment results and conclusions published within this report may be incorrect.

The development location is situated in a primarily urban residential/commercial area. The subject site is located directly across from Manly Beach, with other commercial tenancies located along South Steyne at ground level. High-density residential premises exist to the south-west and north-west of the site, whilst The Sebel Manly Beach hotel adjoins directly to the south-east.

All existing mechanical plant is proposed to be replaced during the development.

The subject site and surrounding properties are identified on the aerial photograph included as Figure 1.

Prevailing ambient noise conditions on-site and in the local area are generally the result of typical environmental noise such as distant traffic and localised domestic/commercial noise sources.

Figure 1. Aerial photo of the subject site and surrounding area (image source – Sixmaps)

3.0 AMBIENT NOISE SURVEY

Existing external ambient noise levels were measured by installing a sound level meter data logger on the south-western façade fronting Dubgowan Lane.

A Type 1 precision Convergence Instruments RT-W noise logger was used for the survey. The installed location on the facade meant that the microphone was approximately 2.5 metres above the ground level. This meter was placed to measure existing background noise levels that would be common for the residents adjoining the commercial site. The noise logger location is shown in figure 1.

The instrument was set-up to measure A-frequency and 'Fast' time-weighted noise levels. Noise level data was stored within the logger memory at 15-minutes intervals for about one week between Friday 26th February and Thursday 4th March 2021.

Calibration readings were taken before and after each survey with a NATA calibrated and certified Larson Davis CAL200 precision acoustic calibrator. No system drift was observed for this meter.

BOM weather records for the nearest available weather station indicate that inclement weather conditions adversely impacted the noise survey. All extraneous noise and inclement weather events were removed from the survey. BOM weather reports are attached as **Appendix A**.

Table 2. Summary of noise logger results [dB]

Location	Period, T [1]	Ambient noise level LAeq	Rating background level LA90
14 South Steyne	Day	65	61
	Evening	65	61
	Night	62	59
Notes 1.	The **NSW EPA NPfI** refers to, **Daytime**: 7 am – 6 pm Monday to Saturday and 8 am to 6 pm Sunday and public holidays. **Evening**: 6 pm – 10 pm Monday to Sunday **Night**: 10 pm - 7 am Monday to Saturday and 10 pm to 8 am Sunday and public holidays.		

Unattended logger graphs are attached as **Appendix B.**

Background noise levels in the area are heavily influenced by a mechanical plant of nearby commercial premises, including the adjoining hotel, The Sebel Sydney Manly Beach. The EPA's amenity criteria have been adopted for compliance in the absence of other plant noise sources.

4.0 ACOUSTICAL REQUIREMENTS

4.1 EPA NOISE POLICY FOR INDUSTRY

Noise emission design targets have been referenced from the NSW Environmental Protection Authority Noise Policy (EPA) for Industry (NPfI). The NPfI replaces the former Industrial Noise Policy, also prepared by the EPA.

The NPfI is designed to assess environmental noise impacts associated with scheduled activities prescribed within the Protection of the Environment Operations Act 1997, Schedule 1. It is also commonly used as a reference tool for establishing suitable planning levels for noise generated by mechanical plant and equipment and noise emission from commercial operations.

The guideline applies limits on the short term intrusive nature of a noise or noise-generating development (project intrusive noise level), as well as applying an upper limit on cumulative industrial noise emissions from all surrounding development/industry (project amenity noise level).

The most stringent of the project intrusive noise level and project amenity noise level is applied as the **project noise trigger level**. The project noise trigger level is the point, above which noise emission from a source or development site would trigger a management response.

To be able to define the more stringent of the intrusive and amenity noise levels, the underlying noise metrics must be the same. As the intrusive noise level is defined in terms of an $L_{Aeq\ 15\ minutes}$ and the amenity noise level is defined in terms of an $L_{Aeq\ Period}$, a correction +3dB correction is applied to the project amenity noise level to equate the $L_{Aeq\ Period}$ to $L_{Aeq\ 15\ minutes}$.

4.2 OFFENSIVE NOISE (POEO ACT 1997 DEFINITION)

In the definitions 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 is likely to be harmful to) a person who is outside the premises 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.

5.0 MECHANICAL PLANT AND BUILDING USE NOISE ASSESSMENT

The mechanical plant on this project may include air conditioning condensers units and other equipment such as ventilation fans. 'Building use noise' relates to noise from the use of the kitchen and waste storage area.

Mechanical plant noise emission has been assessed as per the specification of plant and equipment and installation locations as detailed on the project mechanical services plans, issued by JC Ventilation and Engineering Pty Ltd, Project No. 2022-08, Issue B, dated 04/03/2022.

5.1 PROJECT NOISE CRITERIA

Mechanical plant noise is assessed as per the planning levels contained within the NPfI. Acoustic planning levels are largely determined to the existing environmental noise levels. The following NPfI planning levels apply for this project:

Table 3. NPfI planning levels [dB]

Period, T (Note 1)	Intrusive		Amenity					Project noise trigger level
	RBL	RBL + 5	Area classification	Recommended amenity noise level	High traffic area	Project amenity noise level	+3dB correction	
Daytime	61	66	Urban	60	No	55	58	58
Evening	61	66	Urban	50	No	45	48	48
Night	59	64	Urban	45	No	40	43	43

Notes

1. The NSW EPA NPI refers to,
   Daytime: 7 am – 6 pm Monday to Saturday and 8 am to 6 pm Sunday and public holidays.
   Evening: 6 pm – 10 pm Monday to Sunday
   Night: 10 pm - 7 am Monday to Saturday and 10 pm to 8 am Sunday and public holidays.
2. Project noise amenity level = recommended noise amenity level – 5dB, except where specific circumstances are met, such as high traffic.

Mechanical plant and building use noise levels assessed to nearby commercial properties are not to exceed a recommended project amenity noise level of $L_{Aeq, Period}$ 63dB during business hours.

5.2 EQUIPMENT AND ASSOCIATED SOUND LEVELS

The mechanical services plans identify the following plant and equipment to be installed and other noise sources for the development. Associated noise data is included.

Table 4. Schedule of equipment and noise levels			
Equipment selection	**Descriptor**	**Noise level, [dBA]**	**Location**
Ground Floor Kitchen Exhaust Fan (Fantech GL Gamma Series CE454VGL)	Lp at 3m	47	Roof
First-Floor Kitchen Exhaust Fan (Fantech Multi-Flow MMD 504/4)	Lp at 3m	66	Roof
Pizza Oven Exhaust Fan (Fantech MME354/5)	Lp at 3m	54	Roof
AC Condenser Unit (REYQ12TY1)	Lp at 1m	66	Roof

Smaller ventilation fans such as toilet exhaust fans have not been included in the assessment of mechanical plant because of their low inherent noise level and therefore low acoustical impact to surrounding premises.

5.3 CALCULATED RECEIVER LEVELS

Mechanical plant and building use noise levels have been predicted to nearby residential receivers by way of preparing an acoustic model and conducting point-to-point calculations based on standard sound propagation algorithms. All calculations consider the equipment as selected in the mechanical services plans and their associated sound levels.

The waste storage area is identified on the plans as located on the south-western end of the ground floor of the site adjacent to the internal kitchen area. Noise from the kitchen will be confined to indoor areas where doors are closed. Treatment options are provided for the kitchen entry/exit door.

When predicting noise emission, 2 people are assumed to occupy the external stairway with 50% talking with a normal vocal effort.

Sound power levels attributed to a normal conversational voice are 68 dB L_{wAeq}.

Reference should also be made to additional noise control recommendations included within Section 5.4 and 5.5 of this report, which also governs the calculated receiver noise levels.

Due to the size of the development, several potentially affected receiver locations must be assessed in terms of their respective noise exposure from mechanical plant and building use noise associated with the development. The most noise-sensitive receiver locations are summarised below.

R1	Residential Apartment (Upper Floor Balcony)	46 Victoria Parade
R2	Future Residential Apartment (Upper Floor Balcony)	31 Victoria Parade
R3	Commercial premise (Upper Floor Window	15 South Steyne
R4	Sebel Manly Hotel (Upper Floor Window)	15 South Steyne

Predicted mechanical plant and building use noise levels, inclusive of all identified fans and condenser units are presented in Table 5. CadnaA noise contour graphs are attached in **Appendix C**.

Table 5. Calculated receiver noise levels [dB] – $L_{Aeq,\ 15\ minutes}$

Receiver Locations	Calculated Mechanical Plant and Building Use Noise Levels	Night-time Residential Criteria	Exceedances
R1 - Residential	37	43	-
R2 - Residential	30		-
R3 – Commercial	29	63	-
R4 – Commercial	36		-
Notes 1.	Intrusive noise levels consider that all fans and the mechanical plant may be operating simultaneously over a 15 minutes assessment period during the day, evening, or night period. It is highly unlikely that this scenario would ever occur, therefore actual noise levels may be lower than predicted.		

Mechanical plant and building use noise levels have been assessed to comply with the limiting EPA providing the noise control measures as detailed in **Section 5.4 and Section 5.5** of this report are implemented. Compliance during the night-time period implies compliance during the less stringent daytime and evening periods.

5.4 MECHANICAL PLANT RECOMMENDATIONS

To achieve compliance with the nominated mechanical plant noise criteria at the surrounding residential premises, all fans and equipment should be installed per the mechanical services drawings outlined in Section 5.0 of this report. Alternative fans and equipment may be used, provided it is verified by a mechanical and acoustic engineer.

5.5 BUILDING USE RECOMMENDATIONS

- The 3.6m external stairway privacy screen and the 1.5 m mechanical plant screen should utilise the following construction:
    - 15 mm compressed fibre cement panels with no air gaps at the joins; OR
    - 6 mm compressed fibre cement panels on either side of a 50 mm steel frame with fibre-glass insulation batts (14 kg/m^3) to the cavity.

- The entry door to the kitchen is not required to be of double door construction. The door should be a minimum of 35 - 40mm thick solid-core timber with an acoustical perimeter and door bottom seals. Suitable acoustic seals could be Raven type RP10/RP10si door frame/perimeter seals and RP8si door bottom seals, or an approved equivalent from another manufacturer. The kitchen door should be kept closed at all times.
- Waste should only be collected during the daytime period. Bottle recycling especially must not occur during the nighttime.

6.0 CONCLUSION

Koikas Acoustics was requested to prepare an acoustic report for the proposed alterations and additions to the existing commercial premise at 14 South Steyne, Manly. The acoustic report is to accompany a development application being submitted to Northern Beaches Council.

The assessment considers potential noise impacts to future occupants of the development, and to surrounding residents such that acceptable acoustic amenity for the area is maintained.

Acoustic planning levels have been referenced from current EPA acoustic planning guidelines and requirements.

The included recommendations are based on designs prepared by U+I Building Studio.

The conclusions reached in this report should assist Council in making their determination of the proposal in terms of compliance with the necessary acoustic design requirements. A further detailed acoustic report may be required for the CC submission should the building design be amended, or as required by Council.

Of the assessed components of noise, the following conclusions have been reached:

1. Mechanical plant noise emissions are calculated to be within the acoustic design standards.
2. Building use noise is not expected to exceed the nominated noise criteria provided the recommendations outlined in section 5.5 of this report are properly implemented.

In our professional opinion, there is sufficient scope within the proposed building design to achieve the applied acoustic planning guidelines.

APPENDIX A

APPENDIX A

APPENDIX A

Daily Rainfall (millimetres)

COLLAROY (LONG REEF GOLF CLUB)

Station Number: 066126 · State: NSW · Opened: 1965 · Status: Open · Latitude: 33.74°S · Longitude: 151.31°E · Elevation: 2 m

2021	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1st	*0*	*0.8*	*0*									
2nd	*0.8*	*8.4*	*0*									
3rd	*5.8*	*4.2*	*15.2*									
4th	*1.2*	*0*										
5th	*8.2*	*0*										
6th	*42.6*	↓										
7th	*0*	*2.2*										
8th	*0*	*0*										
9th	*0*	*0*										
10th	*0*	*5.2*										
11th	*0*	*0*										
12th	*0*	*0*										
13th	*0*	*9.8*										
14th	*0*	*13.6*										
15th	*2.0*	*0*										
16th	*0*	*4.8*										
17th	*0*	*0*										
18th	*0*	*4.8*										
19th	*0*	*14.6*										
20th	*2.0*	*0.8*										
21st	*0*	*0.4*										
22nd	*0*	*0*										
23rd	*0*	*0.4*										
24th	*0*	*34.0*										
25th	*0*	*0*										
26th	*0*	*0.6*										
27th	*0*	*0*										
28th	*8.4*	*0.8*										
29th	*8.6*											
30th	*19.4*											
31st	*0.6*											
Highest daily	*42.6*	*34.0*	*15.2*									
Monthly Total	*99.6*	*105.4*										

↓ This day is part of an accumulated total
Quality control: 12.3 Done & acceptable, *12.3* Not completed or unknown

Product code: IDCJAC0009 reference: 73119532

Australian Government
Bureau of Meteorology

Daily Rainfall (millimetres)

COLLAROY (LONG REEF GOLF CLUB)

Station Number: 066126 · State: NSW · Opened: 1965 · Status: Open · Latitude: 33.74°S · Longitude: 151.31°E · Elevation: 2 m

Statistics for this station calculated over all years of data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mean	116.4	132.6	132.4	105.8	104.8	143.2	68.7	62.1	68.7	64.3	85.8	69.7
Median	92.5	124.4	101.0	73.1	82.9	123.9	48.3	45.2	60.5	59.2	76.0	66.1
Highest daily	206.0	*138.2*	115.4	119.6	88.0	*114.4*	86.0	149.0	99.1	83.0	151.4	100.6
Date of highest daily	8th 1973	10th 2020	20th 2011	13th 1971	3rd 2009	5th 2010	1st 2005	7th 1998	2nd 1970	2nd 2004	14th 1969	10th 1970

1) Calculation of statistics

Summary statistics, other than the Highest and Lowest values, are only calculated if there are at least 20 years of data available.

2) Gaps and missing data

Gaps may be caused by a damaged instrument, a temporary change to the site operation, or due to the absence or illness of an observer.

3) Further information

http://www.bom.gov.au/climate/cdo/about/about-rain-data.shtml.

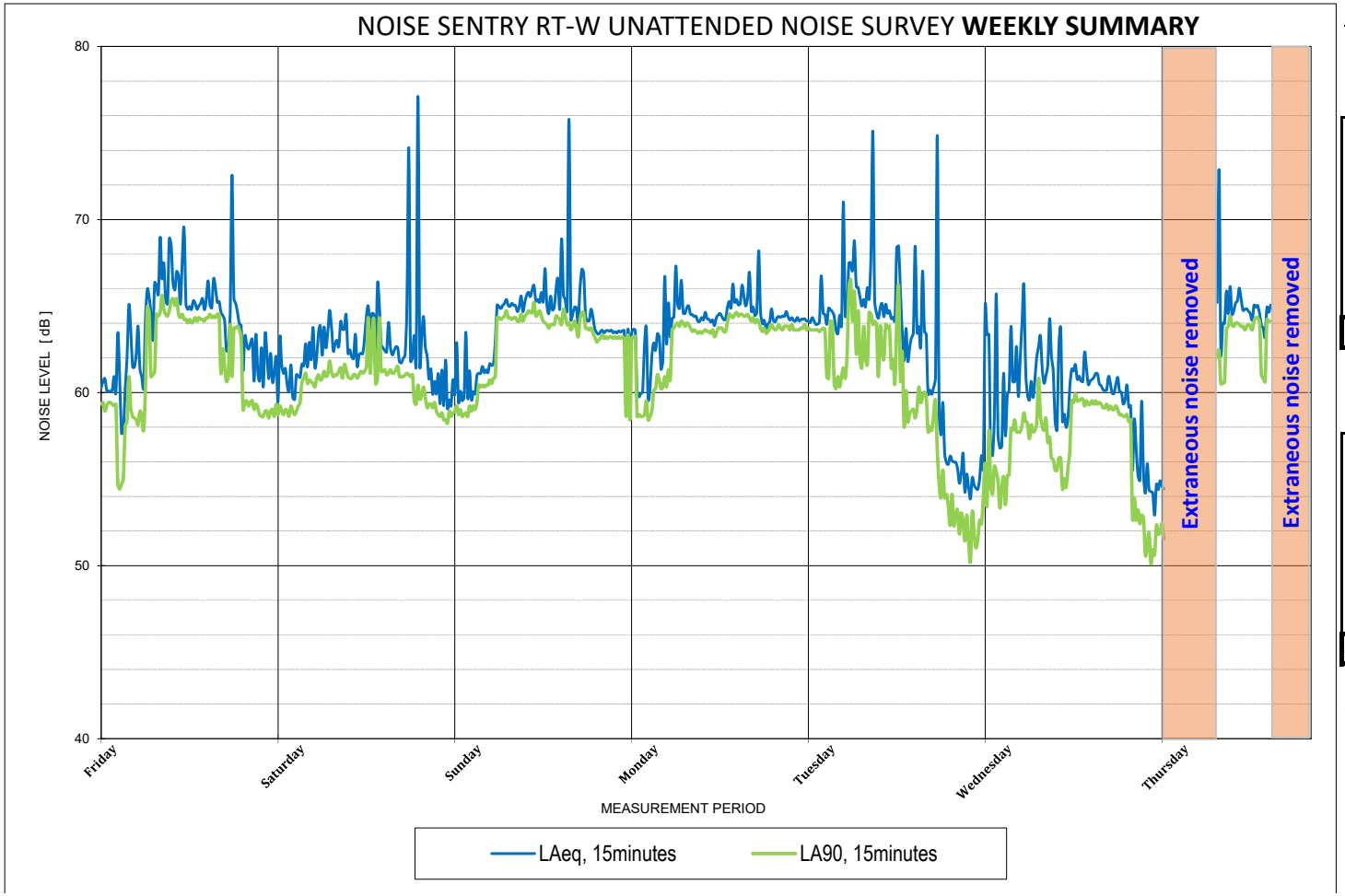
Product code: IDCJAC0009 reference: 73119532 Created on Fri 05 Mar 2021 16:13:49 PM AEDT

APPENDIX B

APPENDIX B

APPENDIX B

WEEKLY SUMMARY **LOGGER LOCATION:** 14 South Steyne, Manly **PERIOD:** 26th Feb to the 4th March 2021



SUMMARY OF AMBIENT NOISE LEVELS

	LA90 Daytime	*LA90* Evening	*LA90* Night-time
Day 1	59	61	54
Day 2	61	61	59
Day 3	61	64	59
Day 4	61	64	59
Day 5	59	55	64
Day 6	56	59	51
Day 7	61	64	51
RBL	**61**	**61**	**59**

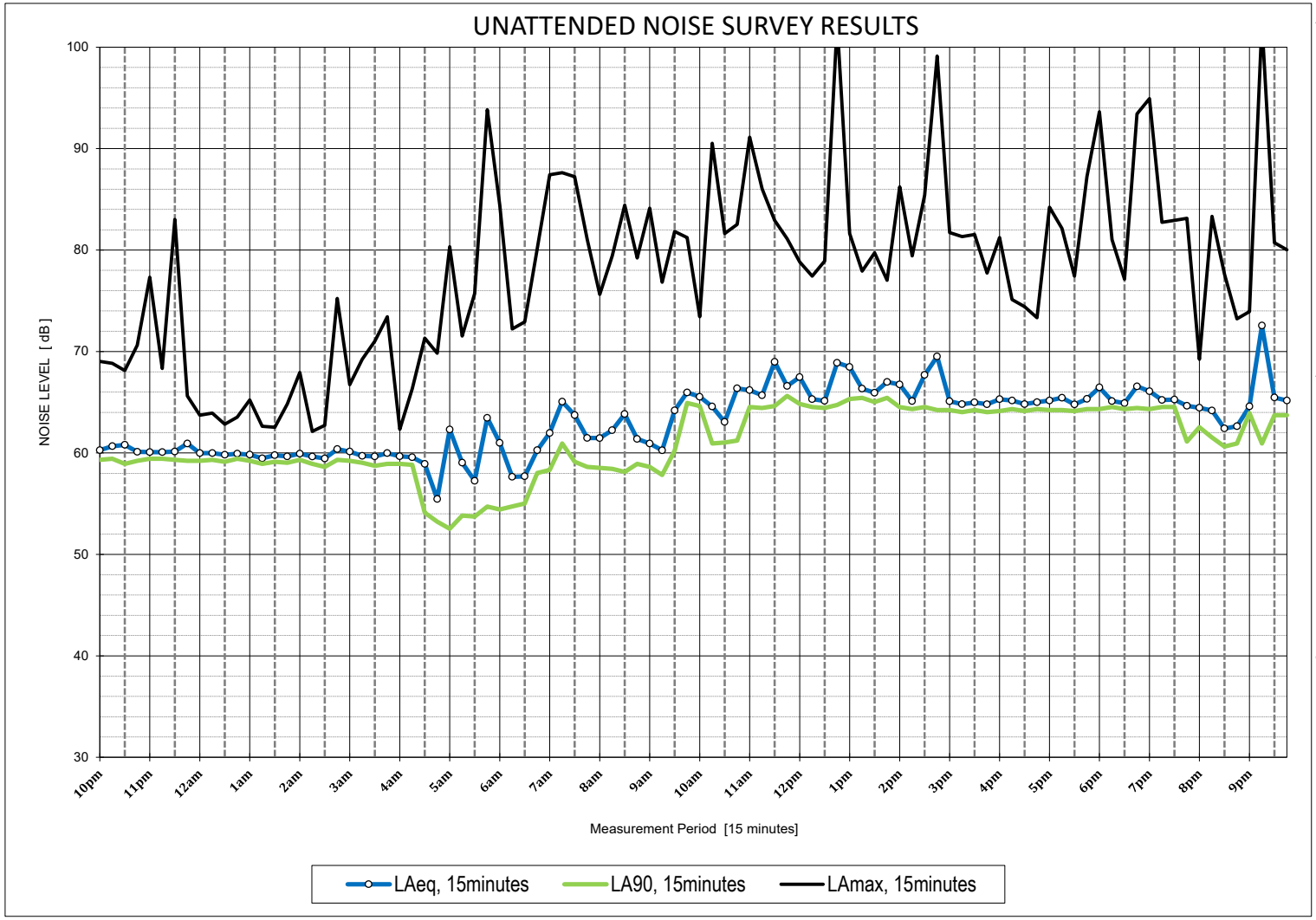
	LAeq Daytime	*LAeq* Evening	*LAeq* Night-time
Day 1	66	66	60
Day 2	63	65	62
Day 3	65	68	64
Day 4	65	65	63
Day 5	66	66	64
Day 6	62	61	59
Day 7	66	65	57
Average	**65**	**65**	**62**

SUMMARY OF TRAFFIC & MISC. NOISE LEVELS

LAeq 15 hrs	0700-2200	65	dB
LAeq 9 hrs	2200-0700	62	dB
Max LAeq 1 hr	0700-2200	67	dB
Max LAeq 1 hr	2200-0700	63	dB

* *Sundays and Public Holidays the hours change to 0800*

DAY 1 **LOGGER LOCATION:** 14 South Steyne, Manly **DATE:** Friday, 26 February 2021



AMBIENT BACKGROUND NOISE METRICS

Descriptor	Period	Level	Units
LA90 Daytime	0700-1800	59	dB
LA90 Evening	1800-2200	61	dB
LA90 Night-time	2200-0700	54	dB

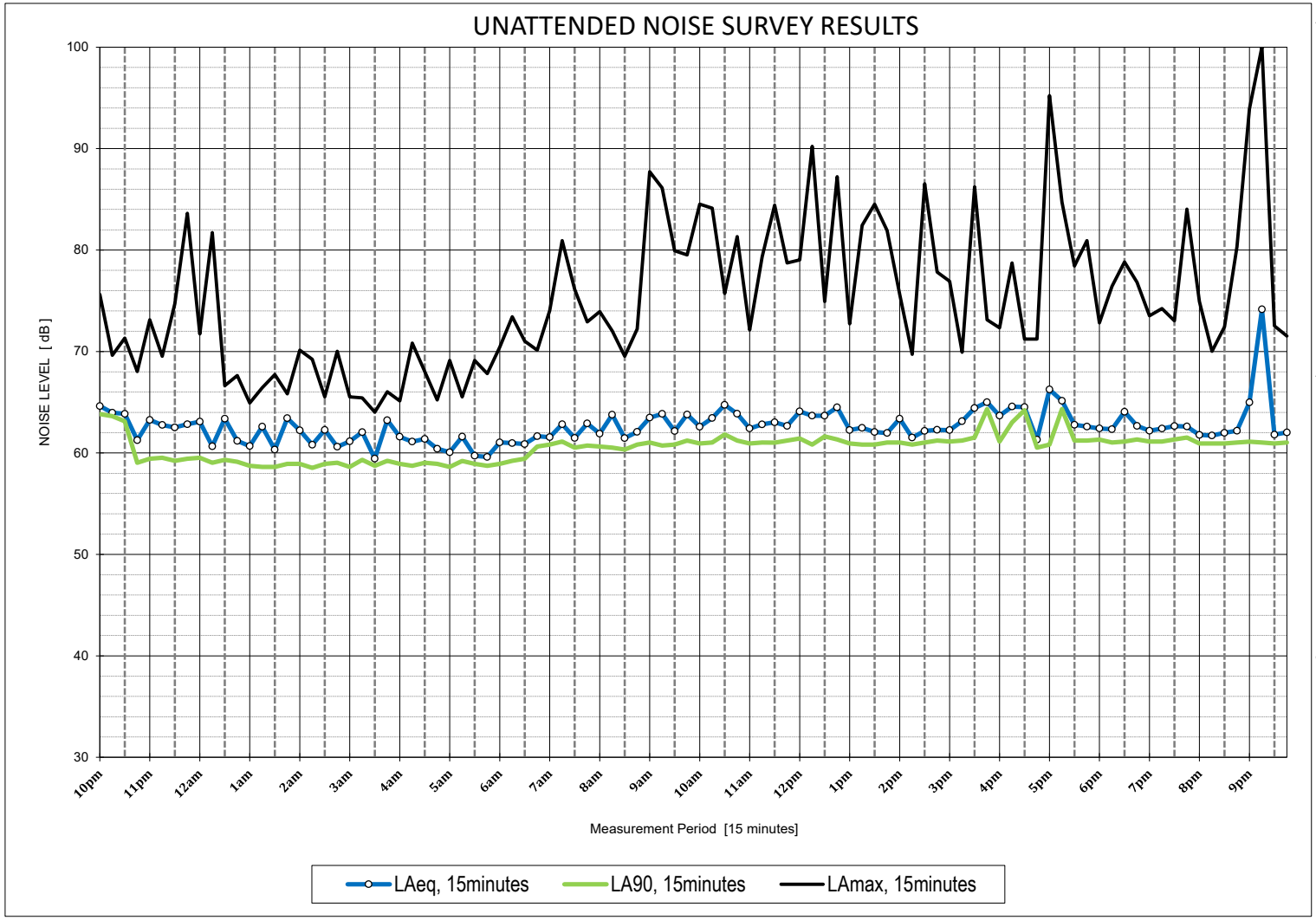
AMBIENT NOISE METRICS

LAeq Daytime	0700-1800	66	dB
LAeq Evening	1800-2200	66	dB
LAeq Night-time	2200-0700	60	dB

TRAFFIC & MISC. NOISE METRICS

LAeq 15 hours	0700-2200	66	dB
LAeq 9 hours	2200-0700	60	dB
Max LAeq 1 hour	0700-2200	67	dB
Max LAeq 1 hour	2200-0700	61	dB

DAY 2 **LOGGER LOCATION:** 14 South Steyne, Manly **DATE:** Saturday, 27 February 2021



AMBIENT BACKGROUND NOISE METRICS

Descriptor	Period	Level	Units
LA90 Daytime	0700-1800	61	dB
LA90 Evening	1800-2200	61	dB
LA90 Night-time	2200-0700	59	dB

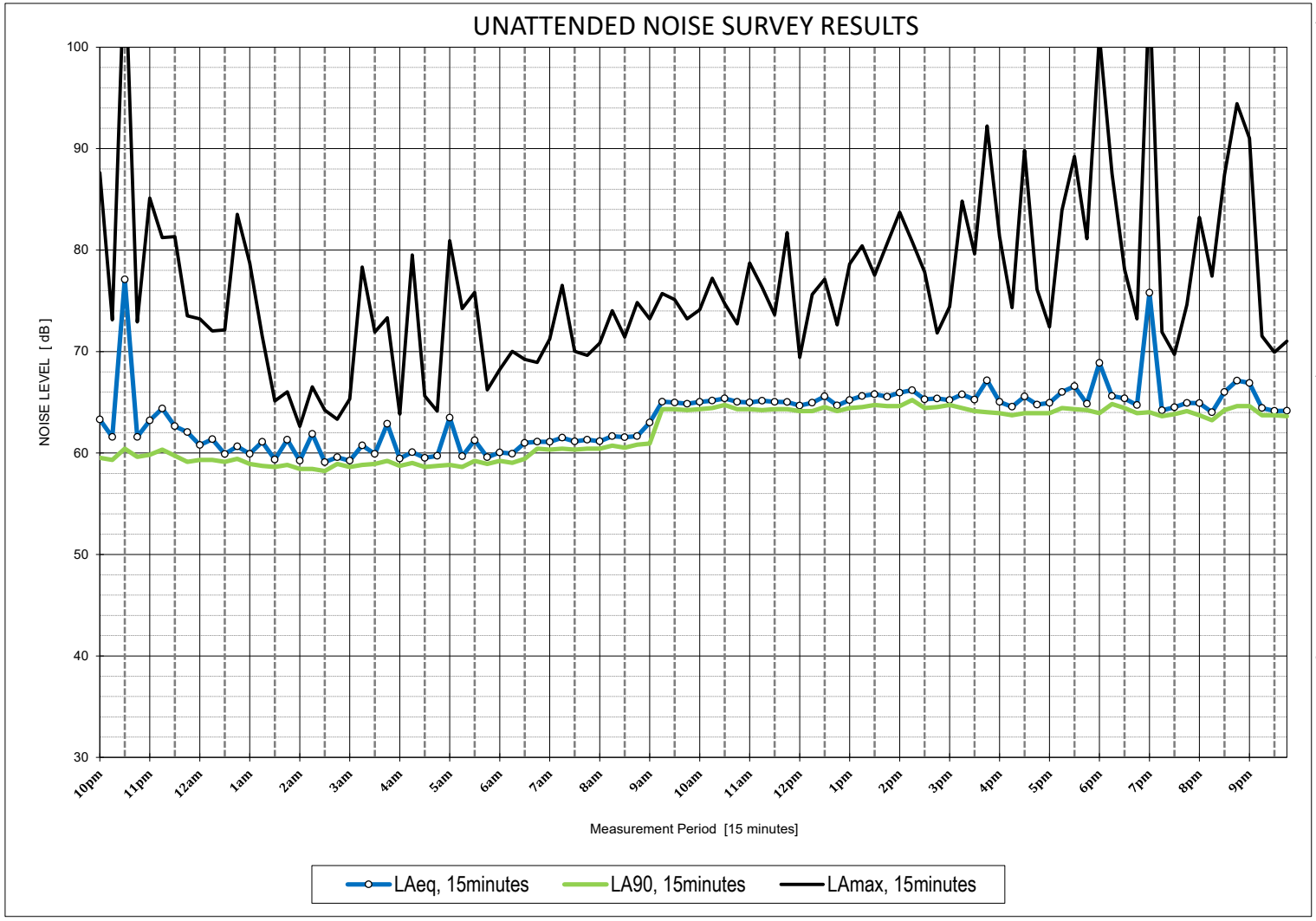
AMBIENT NOISE METRICS

LAeq Daytime	0700-1800	63	dB
LAeq Evening	1800-2200	65	dB
LAeq Night-time	2200-0700	62	dB

TRAFFIC & MISC. NOISE METRICS

LAeq 15 hours	0700-2200	64	dB
LAeq 9 hours	2200-0700	62	dB
Max LAeq 1 hour	0700-2200	64	dB
Max LAeq 1 hour	2200-0700	63	dB

DAY 3 **LOGGER LOCATION:** 14 South Steyne, Manly **DATE:** Sunday, 28 February 2021



AMBIENT BACKGROUND NOISE METRICS

Descriptor	Period	Level	Units
LA90 Daytime	0800-1800	61	dB
LA90 Evening	1800-2200	64	dB
LA90 Night-time	2200-0800	59	dB

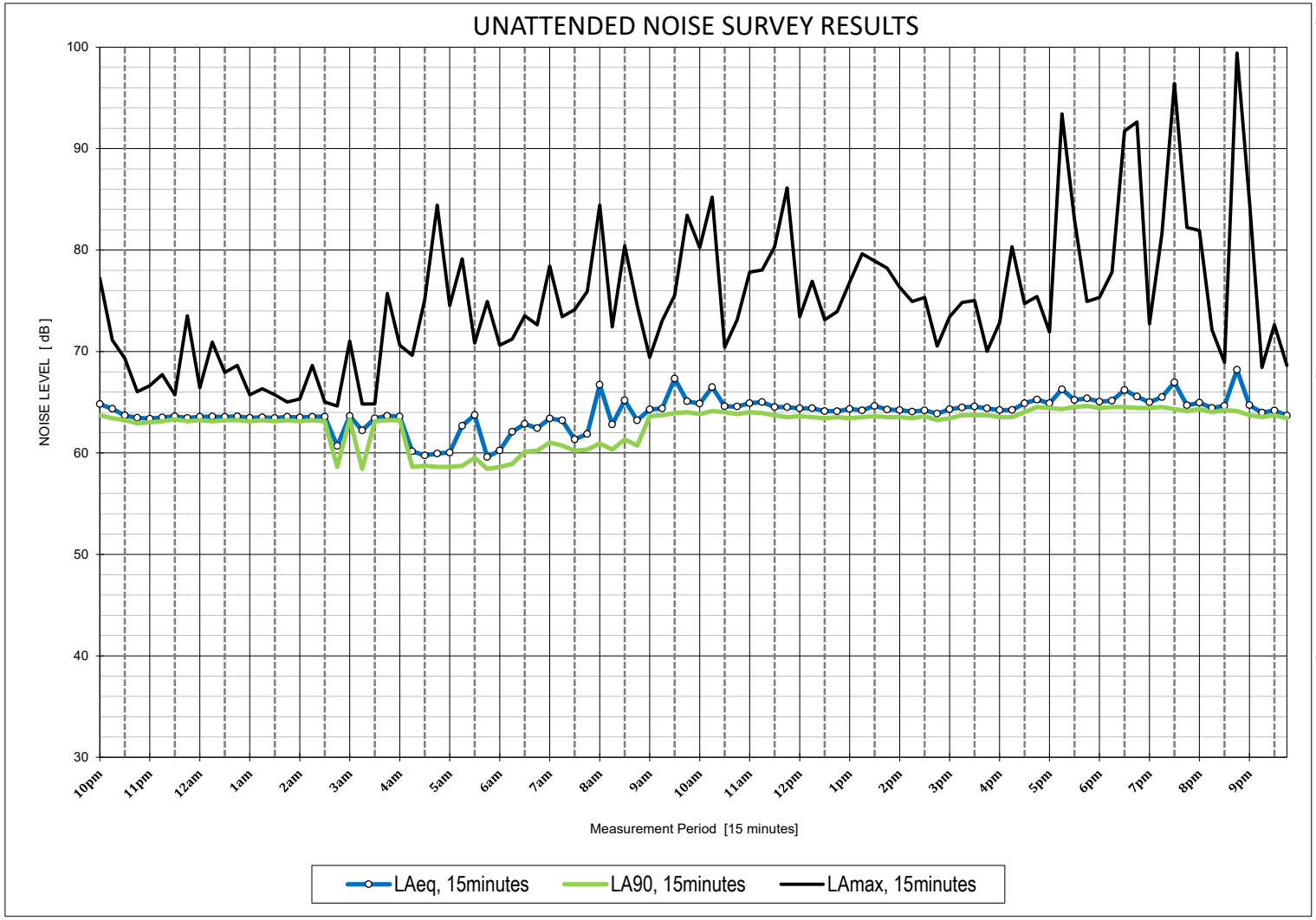
AMBIENT NOISE METRICS

LAeq Daytime	0800-1800	65	dB
LAeq Evening	1800-2200	68	dB
LAeq Night-time	2200-0800	64	dB

TRAFFIC & MISC. NOISE METRICS

LAeq 15 hours	0700-2200	66	dB
LAeq 9 hours	2200-0700	64	dB
Max LAeq 1 hour	0700-2200	67	dB
Max LAeq 1 hour	2200-0700	63	dB

DAY 4 **LOGGER LOCATION:** 14 South Steyne, Manly **DATE:** Monday, 1 March 2021



AMBIENT BACKGROUND NOISE METRICS

Descriptor	Period	Level	Units
LA90 Daytime	0700-1800	61	dB
LA90 Evening	1800-2200	64	dB
LA90 Night-time	2200-0700	59	dB

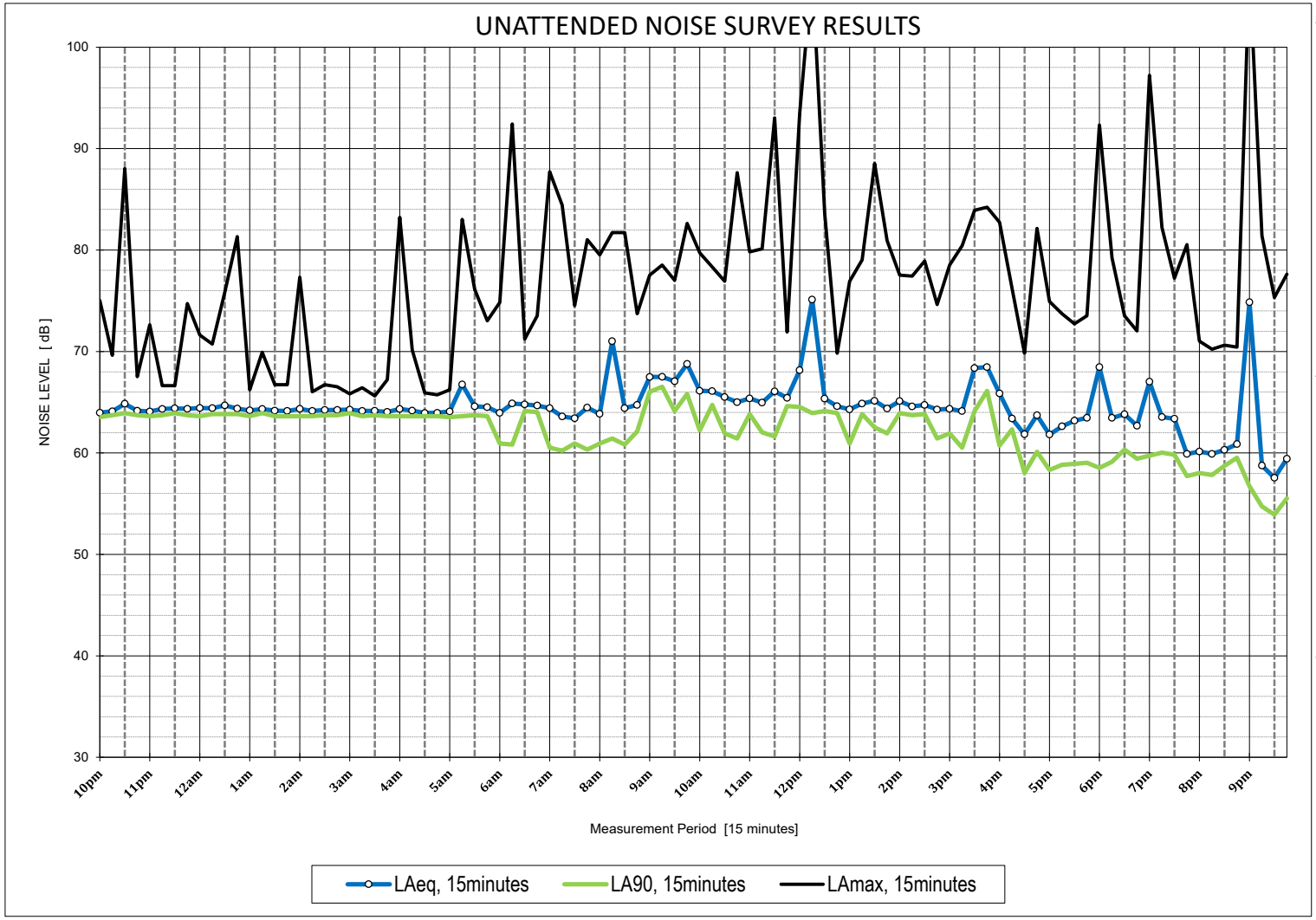
AMBIENT NOISE METRICS

LAeq Daytime	0700-1800	65	dB
LAeq Evening	1800-2200	65	dB
LAeq Night-time	2200-0700	63	dB

TRAFFIC & MISC. NOISE METRICS

LAeq 15 hours	0700-2200	65	dB
LAeq 9 hours	2200-0700	63	dB
Max LAeq 1 hour	0700-2200	66	dB
Max LAeq 1 hour	2200-0700	64	dB

DAY 5 **LOGGER LOCATION:** 14 South Steyne, Manly **DATE:** Tuesday, 2 March 2021



AMBIENT BACKGROUND NOISE METRICS

Descriptor	Period	Level	Units
LA90 Daytime	0700-1800	59	dB
LA90 Evening	1800-2200	55	dB
LA90 Night-time	2200-0700	64	dB

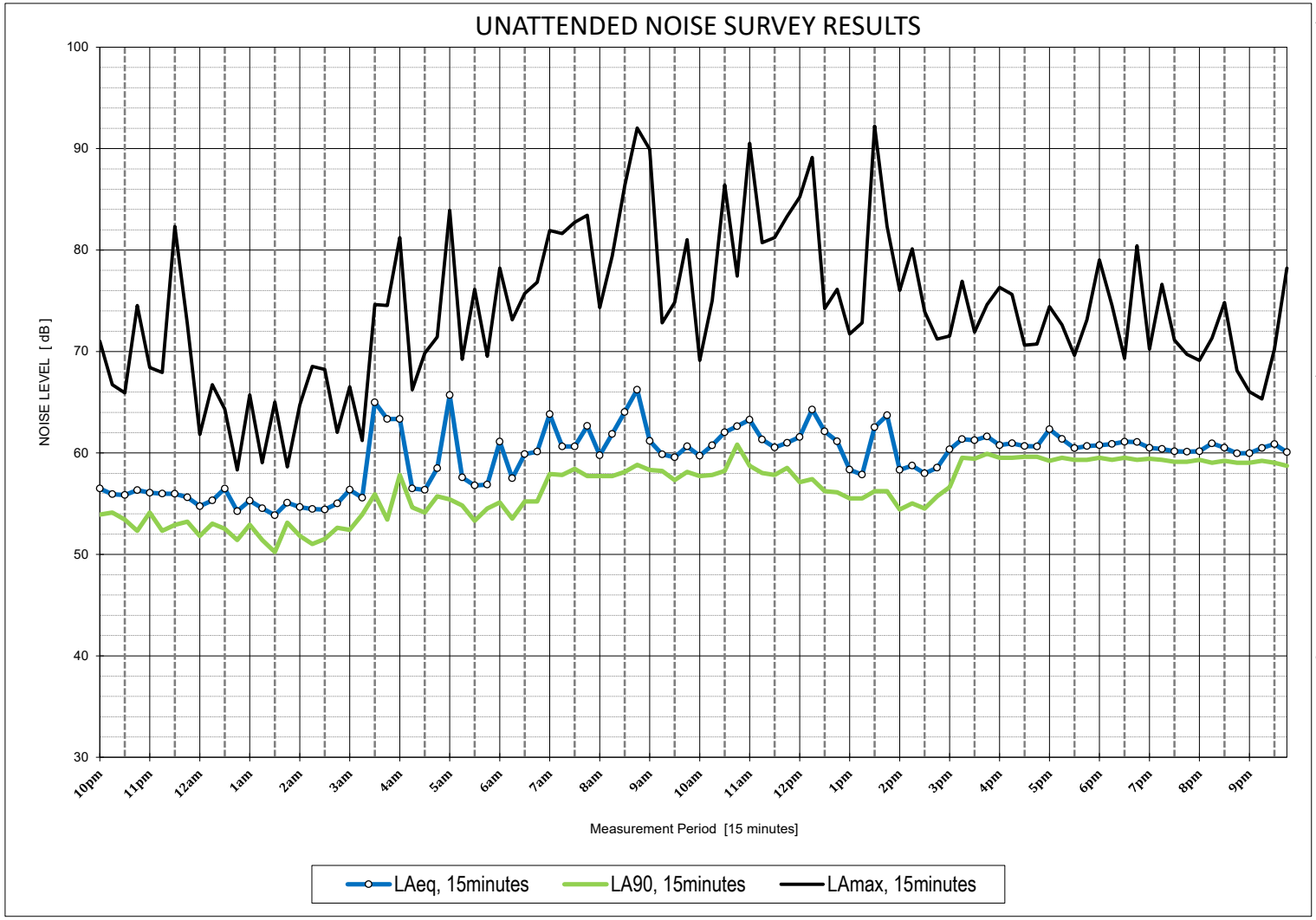
AMBIENT NOISE METRICS

LAeq Daytime	0700-1800	66	dB
LAeq Evening	1800-2200	66	dB
LAeq Night-time	2200-0700	64	dB

TRAFFIC & MISC. NOISE METRICS

LAeq 15 hours	0700-2200	66	dB
LAeq 9 hours	2200-0700	64	dB
Max LAeq 1 hour	0700-2200	69	dB
Max LAeq 1 hour	2200-0700	65	dB

DAY 6 **LOGGER LOCATION:** 14 South Steyne, Manly **DATE:** Wednesday, 3 March 2021



AMBIENT BACKGROUND NOISE METRICS

Descriptor	Period	Level	Units
LA90 Daytime	0700-1800	56	dB
LA90 Evening	1800-2200	59	dB
LA90 Night-time	2200-0700	51	dB

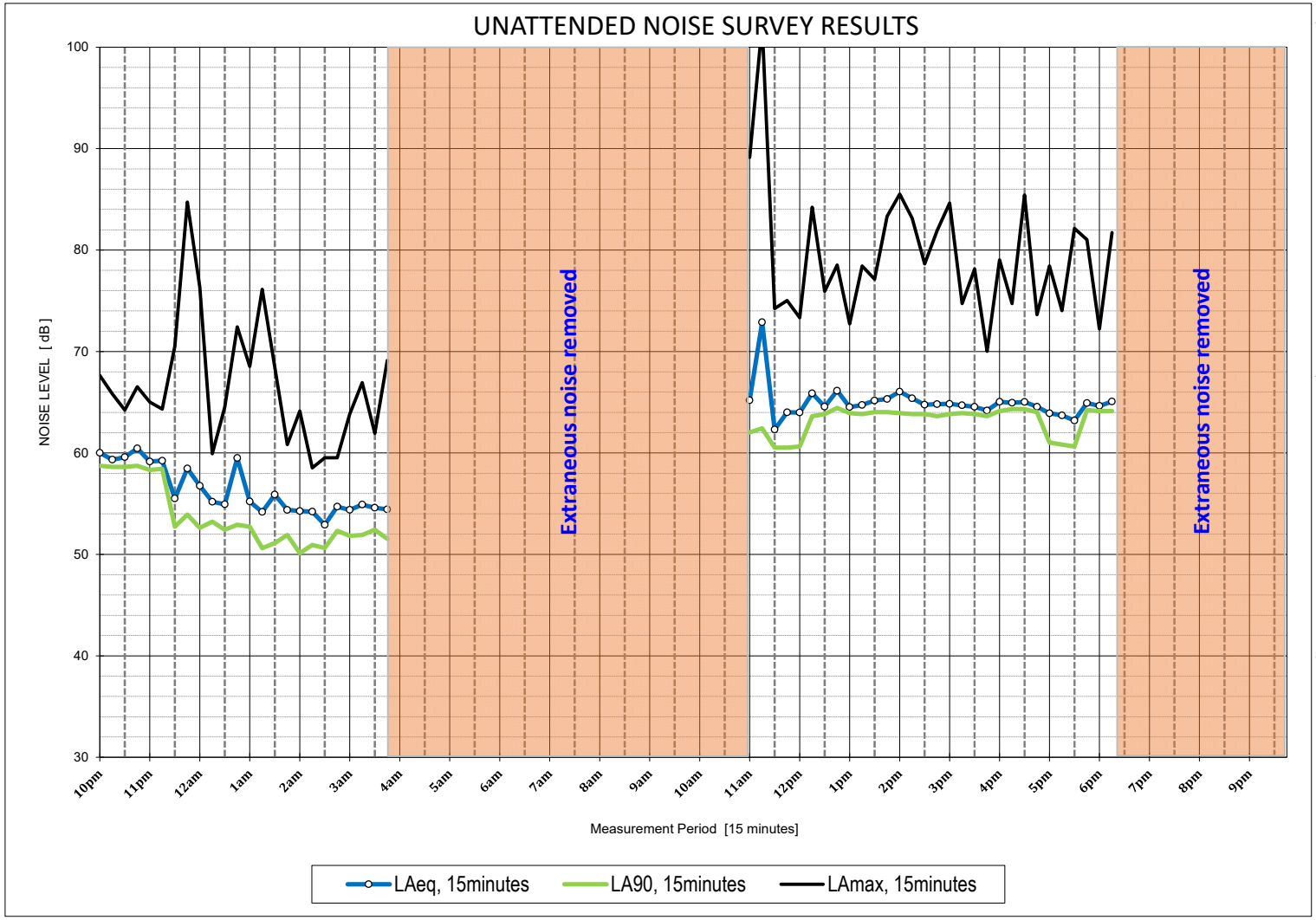
AMBIENT NOISE METRICS

LAeq Daytime	0700-1800	62	dB
LAeq Evening	1800-2200	61	dB
LAeq Night-time	2200-0700	59	dB

TRAFFIC & MISC. NOISE METRICS

LAeq 15 hours	0700-2200	61	dB
LAeq 9 hours	2200-0700	59	dB
Max LAeq 1 hour	0700-2200	62	dB
Max LAeq 1 hour	2200-0700	61	dB

DAY 7 **LOGGER LOCATION:** 14 South Steyne, Manly **DATE:** Thursday, 4 March 2021



AMBIENT BACKGROUND NOISE METRICS

Descriptor	Period	Level	Units
LA90 Daytime	0700-1800	61	dB
LA90 Evening	1800-2200	64	dB
LA90 Night-time	2200-0700	51	dB

AMBIENT NOISE METRICS

LAeq Daytime	0700-1800	66	dB
LAeq Evening	1800-2200	65	dB
LAeq Night-time	2200-0700	57	dB

TRAFFIC & MISC. NOISE METRICS

LAeq 15 hours	0700-2200	65	dB
LAeq 9 hours	2200-0700	57	dB
Max LAeq 1 hour	0700-2200	68	dB
Max LAeq 1 hour	2200-0700	60	dB

APPENDIX C

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Scenario 1
(Mechanical Plant and Building Use Noise)
**** NOISE SOURCES ****

~ 3x Kitchen Exhaust Fans
~ 1x Daikin AC Condenser unit operating continuously
~ 2x Kitchen workers on outdoor stairway speaking
~ Noise from kitchen (door closed)

Note:
- LAeq,15minute noise contours and receiver points R1, R2 & R4 are 10.5 m above ground level.
- Receiver point R3 is 4.5 m above ground level.
- The maximum reading at the nearest resident is 37 dB.
- The maximum reading at the nearest commercial receiver is 36 dB.

PRINT DATE: 01/04/22

- Point Source
- Area Source
- vert. Area Source
- Building
- Barrier
- Contour Line
- Receiver

- > -99.0 dB
- > 35.0 dB
- > 40.0 dB
- > 45.0 dB
- > 50.0 dB
- > 55.0 dB
- > 60.0 dB
- > 65.0 dB
- > 70.0 dB
- > 75.0 dB
- > 80.0 dB
- > 85.0 dB

koikas acoustics PTY LTD
CONSULTANTS IN NOISE & VIBRATION

JOB NUMBER: 4609
CLIENT: Stephen Hayes
SITE ADDRESS: 14 South Steyne, Manly
ASSESSED TO: EPA's Noise Policy For Industry
LIMITING CRITERIA: 43 dB(A) - Night-time (22:00-07:00)