MARTIN
ENVIRONMENTAL
SOLUTIONS

Acoustic Survey and Assessment for Proposed Conversion and Residential Development at, 86-88 Promenade, Blackpool, FY1 1HB.

Prepared for:

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Development House
261 Church Street
Blackpool
FY1 3PB.

July 2021

Contents

1. Introduction

1.1. Martin Environmental Solutions has been commissioned to undertake an acoustic assessment to support a planning application for a ground floor restaurant with residential development above at 86-88 Promenade, Blackpool, FY1 1HB.

Site Location and Context

1.2. The development site is situated in a mid terrace of commercial properties along the Promenade facing the sea front at Blackpool. To the rear is a service alleyway to various commercial businesses, bars, and the development site.

1.3. An aerial Photograph is enclosed in Figure 1.

1.4. It is the potential impact on future occupants of the property that has prompted this survey and report.

2. Policy and Guidance

2.1. The impact of noise can be a material consideration in the determination of planning applications. The planning system has the task of guiding development to the most appropriate locations. It is recognised that on occasions it will be difficult to reconcile some land uses, such as housing, hospitals, or schools, with other activities that generate high levels of noise. However, the planning system is tasked to ensure that, wherever practicable, noise-sensitive developments are separated from major sources of noise (such as road, rail and air transport and certain types of industrial development).

2.2. The Government's publication of the National Planning Policy Framework (NPPF), updated in February 2019, states that planning policies and decisions should prevent new and existing development from contributing to or being put at unacceptable risk from, of being adversely affected by unacceptable levels of noise pollution.

2.3. The Government have also issued the Noise Policy Statement for England (NPSE). The NPSE clarifies the Government's underlying principles and aims in relation to noise and sets a vision to promote good health and a good quality of life through the effective management of noise while having regard to the Government's sustainable development strategy. The NPSE aims to mitigate and minimise adverse impacts on health and quality of life through the effective management and control of noise.

2.4. The NPSE introduces the following terms, although no sound levels are given to represent these, many authorities have identified the sound level criteria in line with the World Health Organisation, BS8233:2014 and BS4142: 2014 levels. The terms introduced by the NPSE are:

NOEL – No Observed Effect Level (<30dB(A)inside <50dB(A) outside, 10dB below background)
LOAEL – Lowest Observed Adverse Effect Level (30-35dB(A) inside 50-55dB(A) outside, background to +5dB)
SOAEL – Significant Observed Adverse Effect Level (>35dB(A) inside, >55dB(A) outside, >+10dB above background)

2.5. The sound levels within the brackets of the previous paragraph are those determined as appropriate levels to indicate the relevant effect levels represented by the NPSE.

2.6. Other commonly used examples of standards utilised by Local Planning authorities for the consideration of noise impacts include comparison of the likely noise levels to be experienced at a development, with levels that have been recommended by the World Health Organisation (WHO) as Guidelines for the prevention of Community Noise Annoyance and within BS8233: 2014.

2.7. The WHO recommended noise levels for outdoor amenity areas (gardens) that should not be exceeded are 55dB(A) $L_{Aeq,16hr}$ in order to avoid 'Serious Community Annoyance or 50dB(A) $L_{Aeq,16hr}$ to avoid 'Moderate Community Annoyance' during the day. For indoor levels WHO set 35dB(A) $L_{Aeq,16hr}$ during the day to prevent Moderate Annoyance and 30 dB(A) $L_{Aeq,8hr}$ at night to prevent sleep disturbance.

2.8. The WHO guidance also recommends that maximum sound levels at night should not regularly exceed 45dB(A) within bedrooms to prevent sleep disturbance. Regularly is considered to be more than 10 times during any 8-hour night-time period.

2.9. BS 8233:2014 'Guidance on sound insulation and noise reduction for buildings' also specifies desirable noise levels to be achieved inside dwellings.

2.10. BS 8233:2014 'Sound insulation and noise reduction for buildings – Code of Practice' also specifies desirable noise levels to be achieved inside dwellings. BS 8233 presents two levels, the first between the hours of 07:00 – 23:00 and the second between 23:00 -07:00.

2.11. The daytime period suggests internal noise levels of 35dB $L_{Aeq,16hr}$, for resting in living rooms and bedrooms while for night-time a level of 30dB LAeq,8hr is recommended. Criteria for external areas mirrors that within the WHO guidance.

2.12. Another commonly used standard is British Standard 4142:2014 'Method for rating industrial and commercial sound' compares the sound predicted by the source in question against the background, L_{A90} sound levels.

2.13. The "residual" L_{Aeq} measurement is then subtracted from the "ambient" L_{Aeq} measurement (with the sound source) to calculate the sound level created by the "problem" sound alone -termed the "specific" sound level.

2.14. If the "problem" sound is tonal, such as whine or hum, or if it is impulsive such as bangs or clatters or if it is irregular enough to attract attention a correction is added to the "specific level" to produce the "rating level". The "background" L_{A90} measurement is then compared against the "rating level".

2.15. If the "rating level" exceeds the "background" by around 10dB(A) or more this "indicates a significant adverse impact". A difference of around 5dB(A) 'indicates an adverse impact. The lower the commercial noise level is, the lower the likely impact. In addition, the published 'ProPG Planning & Noise, Professional Practice Guidance on Planning & Noise, New Residential Development' provides a 4-staged approach to undertaking a risk assessment in relation to anticipated sound levels at new residential development and the provision of mitigation measures. The guidance is principally aimed at sites exposed predominantly to noise from transportation sources.

2.16. In addition, the 'ProPG Planning & Noise, Professional Practice Guidance on Planning & Noise, New Residential Development' provides a 4-staged approach to undertaking a risk assessment in relation to anticipated sound levels at new residential development and the provision of mitigation measures. The guidance is principally aimed at sites exposed predominantly to noise from transportation sources.

2.17. The first stage consists of an initial noise risk assessment, based on indicative day and night-time *noise* levels. Simply put, the higher the ambient noise in an area the greater the impact. The levels given are shown below although it should be noted that these are in excess of both the Lancashire guidance, WHO and BS 8233: 2014.

Noise Risk Category*	Potential Effect if Unmitigated	Pre-Planning Application Guidance
0 – Negligible $L_{Aeq,16hr}$ **<50dB** $L_{Aeq,8hr}$ **<40dB**	May be noticeable but no adverse effect on health and quality of life	In this category the development is likely to be acceptable from a noise perspective, nevertheless a good acoustic design process is encouraged to improve the existing environment and/or safeguard against possible future deterioration and to protect any designated tranquil areas. A noise assessment may be requested to demonstrate no adverse impact from noise. Application need not normally be delayed on noise grounds.
1 – Low $L_{Aeq,16hr}$ **50-63dB** $L_{Aeq,8hr}$ **40-55dB**	Adverse effect on health and quality of life	In this category the development may be refused unless a good acoustic design process is followed and is demonstrated via a Level 1 Acoustic Design Statement which confirms how the adverse impacts of noise on the new development will be mitigated and minimised and that a significant adverse impact will not arise in the finished development. Planning conditions and other measures to control noise may be required.
2 – Medium $L_{Aeq,16hr}$ **63-69dB** $L_{Aeq,8hr}$ **55-60dB** L_{AFmax} **>80dB****	Significant adverse effect on health and quality of life	In this category the development is likely to be refused unless good acoustic design process is followed and is demonstrated via a Level 2 Acoustic Design Statement which confirms how the adverse impacts of noise on the new development will be mitigated and minimised, and clearly demonstrates that a significant adverse noise impact will not arise in the finished development. Planning conditions and other measures to control noise will normally be required.
3 – High $L_{Aeq,16hr}$ **>69dB** $L_{Aeq,8hr}$ **>60dB** L_{AFmax} **>80dB****	Unacceptable adverse effect of health and quality of life	In this category the development is very likely to be refused on noise grounds, even if a good acoustic design process is followed and is demonstrated via a Level 2 Acoustic Design Statement. Applicants are advised to seek expert advice on possible mitigation measures. Advice on the circumstances when the refusal of a new housing on noise grounds should normally be anticipated is included in the ProPG.

2.18. Stage 2, consists of a full assessment of the prevailing ambient noise and requires 4 elements to be considered:

I. Element 1 – Good Acoustic Design
II. Element 2 – Internal Noise Level Guidelines
III. Element 3 – External Amenity Area Noise Assessment
IV. Element 4 – Assessment of Other Relevant Issues

2.19. A good acoustic design is implicit in meeting the requirements of the NPPF and can help to resolve many potential acoustic issues.

2.20. Details of the criteria considered suitable are provided above for both internal and external sound levels. Element 4 includes such issues as local and national policy, likely occupants, wider planning objectives.

3. The Assessment

3.1 On-site monitoring was undertaken over the 10th-11th June 2021 in order to obtain prevailing background sound levels for the area.

3.2 Sound level meters were positioned at a first-floor level just over 1m from the façade to the front of the property and on a flat roof to the rear.

3.3 The meters, Cirrus Optimus Green Sound level meters, were field calibrated before and after the monitoring period with no significant deviation. Calibration certificates are available on request.

3.4 The weather during the monitoring was dry, warm. A slight wind below 5m/s was evident to the front of the site and the enclosed nature of the rear meant there was no wind affecting the microphone at this location.

3.5 The full results are available in Appendix A, with a summary in the tales below;

Front

Start Time	End Time	Duration	LAeq	LA90	LAMax
10/06/2021 19:00	10/06/2021 23:00	03:59:58	67.4	59.8	98.2
10/06/2021 23:00	11/06/2021 07:00	08:00:00	63.5	56.8	97.8
11/06/2021 07:00	11/06/2021 23:00	16:00:00	68.5	60.4	104.7
11/06/2021 23:00	12/06/2021 07:00	08:00:00	63.0	51.8	92.8
12/06/2021 07:00	12/06/2021 09:56	02:56:49	66.1	53.7	89.4

Rear

Start Time	End Time	Duration	LAeq	LA90	LAMax
10/06/2021 22:00	10/06/2021 23:00	00:59:59	70.0	52.1	107.4
10/06/2021 23:00	11/06/2021 07:00	08:00:00	53.6	51.3	77.5
11/06/2021 07:00	11/06/2021 23:00	16:00:00	62.4	53.0	109.2
11/06/2021 23:00	12/06/2021 07:00	08:00:00	63.1	52.5	106.4
12/06/2021 07:00	12/06/2021 09:00	02:00:01	54.7	52.6	87.1

3.6 The maximum regularly exceeded sound levels identified were 82.1dB(A) at the front and 89.2dB(A) at the rear. Given a 15dB attenuation[1] for an open window the sound levels to be experienced by the future occupants are above those identified within the

[1] BS8233: 2014; Guidance on sound insulation and noise reduction for buildings

guidance documents detailed in section 2 of the report. Therefore, further mitigation measures are required.

3.7 Sound levels to the front were dominated by passing traffic while to the rear air handling units, refrigeration and emptying of glass were identified.

3.8 In order to achieve the recommended sound levels a reduction of 37.1dB R_W is required at the front of the property and 44.2dB R_w at the rear. These figures relate predominantly to the maximum sound levels identified and the criterion of 45dB L_{AMax}. The specification to the front needs to be rated towards traffic noise, C_{Tr}.

3.9 A standard 6/12/6 double glazing unit will provide a sound reduction, $R_w(C;C_{tr})$, of 33(-1;-3). Thus, for the front a reduction of 30dB when closed. Therefore, a high specification of glazing is required.

3.10 To the front it is recommended that a Pilkington Optiphon 8/16/12.8 doble glazing unit is installed to glazed doors overlooking the roadway. This level of glazing will provide a 43(-2;-6)dB R_w reduction achieving the required in ternal sound levels. Other manufacturers with similar specifications are available.

3.11 For the rear it is recommended that a Pilkington Optiphon 10/16/8.8 double glazing unit is used within all habitable rooms providing a reduction of 44(-2;-6)dB R_w reduction.

3.12 A continuous tone was identified to the rear of the site at the 50 and 80 Hz range of 53.0dB. the above glazing specification will provide a reduction of 31.4 & 30.1dB at these frequencies resulting in an internal sound level of 21.6 & 22.9dB respectfully.

3.13 The Salford University ‘Procedure for assessment of low frequency noise disturbance’; 2005 guidance which promotes the use of the NANR45 criteria curve. The curve provides target sound levels at 1/3 octave levels from 10Hz to 160Hz. The target values for the 50 & 80 Hz frequencies are 43 and 40dB respectfully.

Table 2 Proposed reference curve

Hz	10	12.5	16	20	25	31.5	40	50	63	80	100	125	160
dB, Leq	92	87	83	74	64	56	49	43	42	40	38	36	34

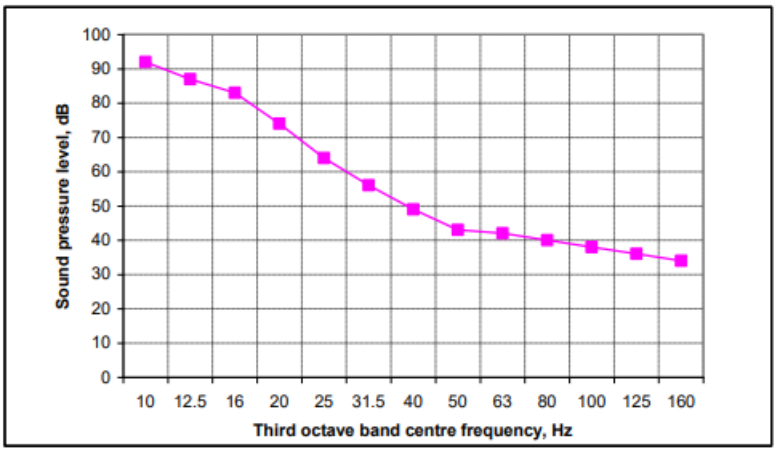


Figure 1 Criterion curve for assessment of low frequency noise

3.14 The above glazing is therefore adequate to the protect the internal environment from the plant noise associated at the rear.

3.15 The plant noise is continuous throughout the day and night the above glazing specifications will ensure internal sound levels are acceptable and will result in sound levels below both the World Health Organisation/BS8233:2014 levels and the NANR curve criteria for low frequencies. Even if a correction to the sound is made in line with BS4142:2014 the levels are still acceptable.

3.16 To be able to keep windows closed additional ventilation provision must be made for the property. As such it is recommended that a ventilation system is used incorporating acoustic wall ventilators for each habitable room to the proposed properties. The ventilators must achieve a similar of better performance to the windows when open and several suitable models are available from suppliers including the Greenwood DN MA3051 Vent providing $D_{N,e,w}$ of 55dB attenuation. Other models and manufacturers area available.

Consideration of the ground floor

3.17. The ground floor of the building is to be utilised as a restaurant, with kitchen facilities in the basement. As such to ensure sufficient fire separation and acoustic separation to the above residential properties any dividing structure must be adequately

constructed. An extraction system is also to be installed running internally through the property. This is to pass within the corridor area on each floor and is to be acoustically (and fire) separated from the corridor by a wall.

3.18. It is recommended that the separating floor between the restaurant and the first-floor accommodation should be constructed to achieve a minimum rating of 50 R_w to ensure adequate protection of the residential properties. This would allow sound levels of up to 85dB(A) during the day and 80dB(A) at night to be generated while achieving the WHOBS8233:2014 guideline levels. These are particularly high levels for a restaurant ad unlikely to be witnessed even with background music. They also alone to the Control of Noise at Work 2005 requirements.

3.19. A suggested specification is provided in Appendix B, although the current structure is currently unknown, and this may allow for some alterations.

3.20. Similarly, the details of the extraction system are currently unknown but typical break out sound levels are in the region of 66dB(A). Based on this a minimum specification for the dividing wall structure has been identified, see Appendix C.

4 Conclusion

4.1 On-site monitoring has identified existing background sound levels will result in an adverse impact on those proposed properties to the front of the development. As such additional mitigation measures are required.

4.2 These have been identified as enhanced acoustic glazing to the front and rear of the property to be fitted to all habitable rooms. To ensure adequate ventilation it is recommended that an acoustic wall ventilator is fitted to each habitable room.

4.3 A minimum design specification for the separating structures between the ground and first floor and around the ventilation system has also been identified. These may change based on the design, but the minimum sound reduction levels should be achieved.

4.4 The inclusion of the above mitigation measures to all habitable rooms will ensure that the internal and external sound levels are acceptable and will result in a No Observe Effect on the future residents in line with the Noise Policy Statement for England.

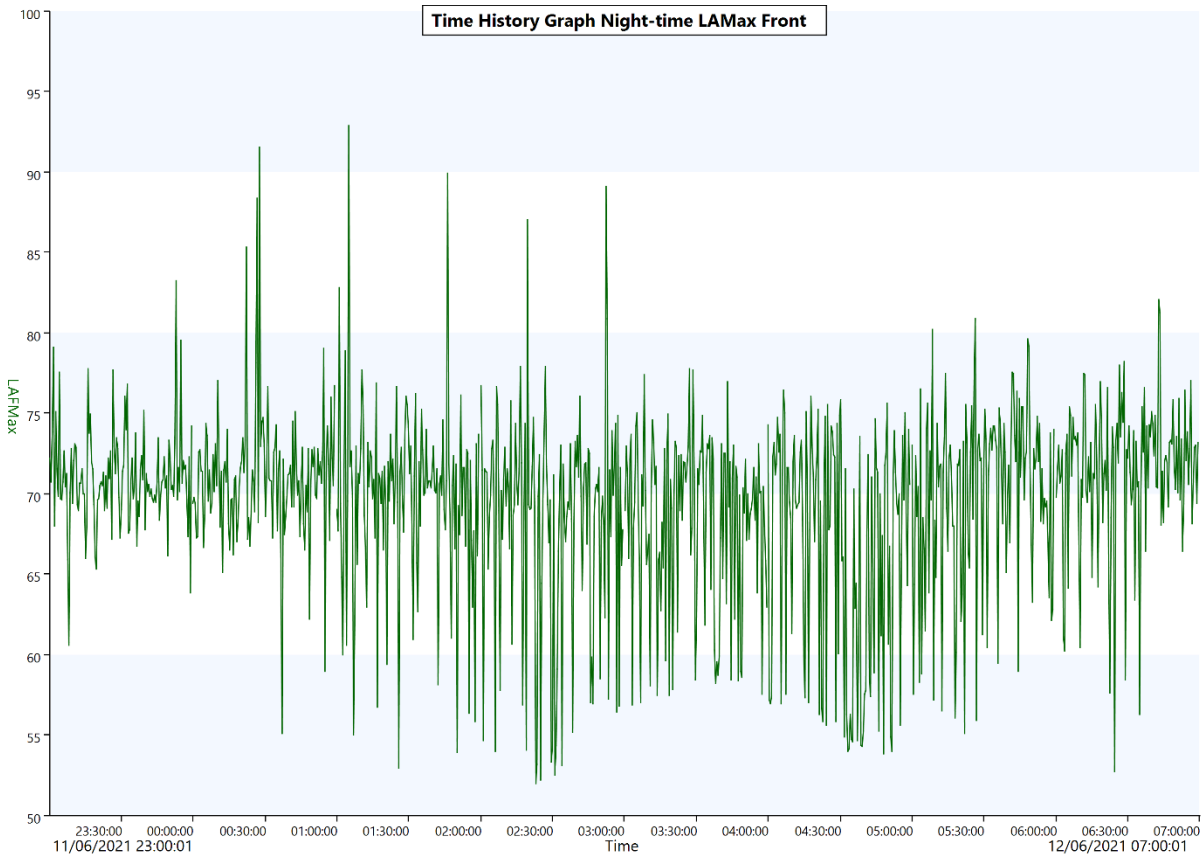
4.5 As such the development will meet the objectives of the National Planning Policy Framework in ensuring that no significant adverse impact is experienced by the future residents. The development is therefore considered to be acceptable in terms of noise.

Figure 1 – Aerial Photograph

Appendix A – Full Monitoring Results

Front

Time	L_{Aeq} (dB)	L_{AMax} (dB)	L_{A90} (dB)
10/06/2021 19:00	67.8	96.9	58.3
10/06/2021 20:00	69.2	98.2	58.9
10/06/2021 21:00	65.8	82.0	61.5
10/06/2021 22:00	65.7	80.0	61.0
10/06/2021 23:00	64.6	88.7	56.8
11/06/2021 00:00	62.1	86.2	53.6
11/06/2021 01:00	61.3	77.2	55.3
11/06/2021 02:00	62.4	78.0	59.2
11/06/2021 03:00	63.2	97.8	58.3
11/06/2021 04:00	61.7	81.5	57.3
11/06/2021 05:00	64.7	80.1	59.1
11/06/2021 06:00	65.8	80.7	58.7
11/06/2021 07:00	68.9	85.2	61.5
11/06/2021 08:00	69.0	93.6	62.7
11/06/2021 09:00	69.0	89.3	62.4
11/06/2021 10:00	68.9	85.2	64.0
11/06/2021 11:00	67.0	85.5	63.3
11/06/2021 12:00	66.5	90.8	61.2
11/06/2021 13:00	72.5	104.7	61.2
11/06/2021 14:00	71.1	101.7	61.7
11/06/2021 15:00	66.1	91.8	60.8
11/06/2021 16:00	65.2	79.0	59.9
11/06/2021 17:00	69.6	101.1	59.7
11/06/2021 18:00	66.2	95.8	59.0
11/06/2021 19:00	67.2	99.8	57.9
11/06/2021 20:00	65.7	83.3	57.8
11/06/2021 21:00	69.0	103.4	58.1
11/06/2021 22:00	65.5	87.3	58.3
11/06/2021 23:00	64.2	83.2	54.7
12/06/2021 00:00	64.1	91.5	52.9
12/06/2021 01:00	63.6	92.8	50.2
12/06/2021 02:00	61.8	89.1	49.6
12/06/2021 03:00	61.5	77.8	54.9
12/06/2021 04:00	60.6	76.4	52.2
12/06/2021 05:00	62.8	80.8	51.8
12/06/2021 06:00	63.8	82.1	50.7
12/06/2021 07:00	65.3	78.6	51.3
12/06/2021 08:00	66.6	82.7	54.5
12/06/2021 09:00	66.3	89.4	58.3


Time History Graph Night-time LAMax Front
LAFMax
100
95
90
85
80
75
70
65
60
55
50
23:30:00
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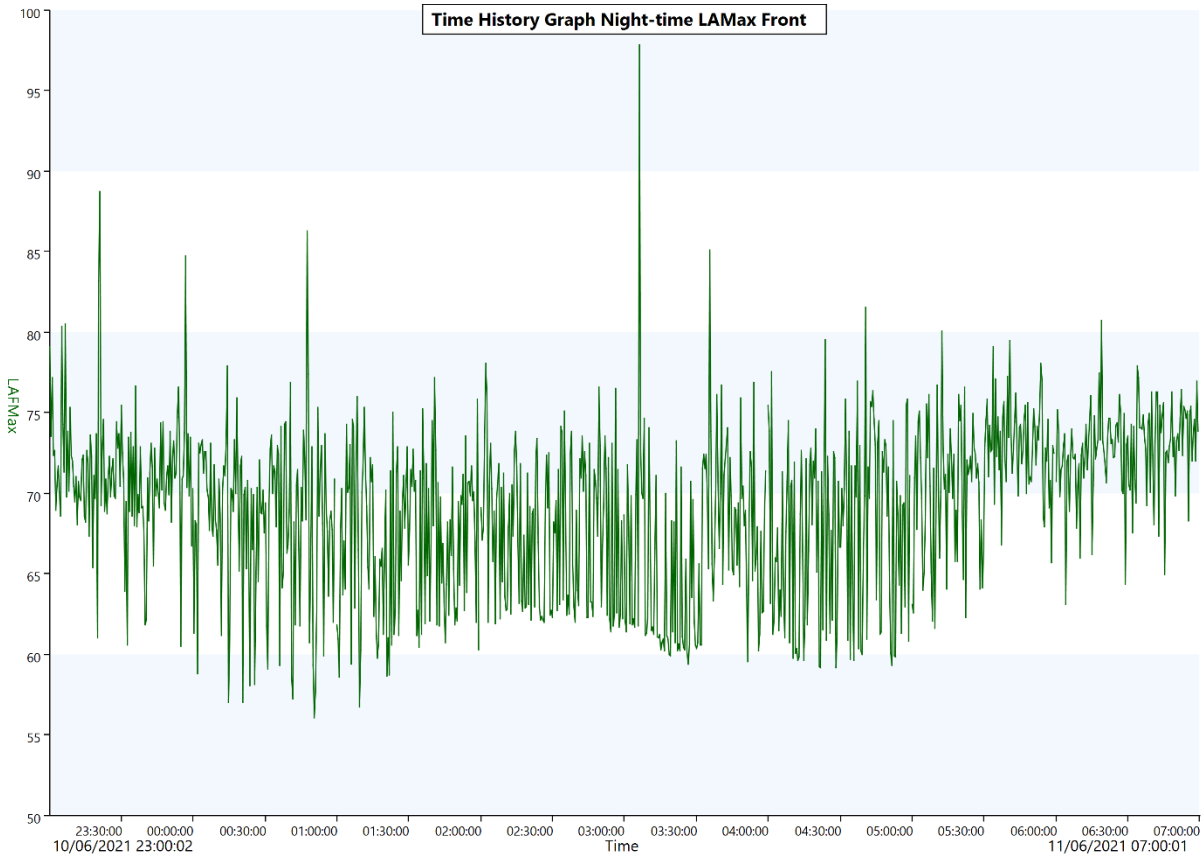
Time History Graph Night-time LAMax Front
LAFMax
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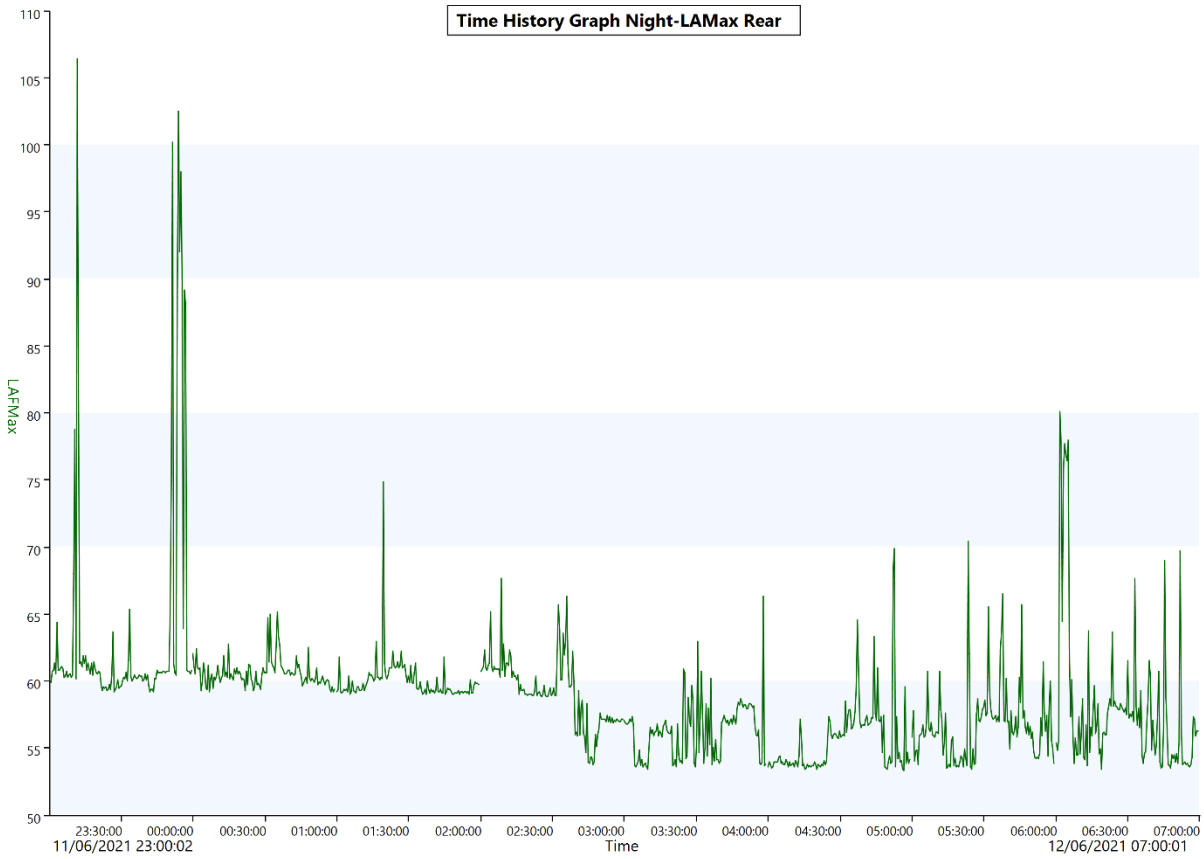
04:30:00
05:00:00
05:30:00
06:00:00
06:30:00
07:00:00
11/06/2021 07:00:01
Time

Rear

Time	L_{Aeq} (dB)	L_{AMax} (dB)	L_{A90} (dB)
10/06/2021 22:00	70.0	107.4	52.0
10/06/2021 23:00	53.9	73.5	51.4
11/06/2021 00:00	53.5	60.9	51.0
11/06/2021 01:00	53.4	69.2	51.0
11/06/2021 02:00	53.0	67.3	51.1
11/06/2021 03:00	53.5	77.5	51.2
11/06/2021 04:00	53.5	71.2	51.3
11/06/2021 05:00	53.8	66.2	51.7
11/06/2021 06:00	54.0	71.8	51.7
11/06/2021 07:00	54.8	67.5	53.1
11/06/2021 08:00	55.8	87.3	53.1
11/06/2021 09:00	56.8	81.9	53.0
11/06/2021 10:00	55.0	66.1	53.2
11/06/2021 11:00	55.0	68.7	53.1
11/06/2021 12:00	71.4	109.2	52.7
11/06/2021 13:00	55.0	78.9	52.5
11/06/2021 14:00	55.2	72.2	52.8
11/06/2021 15:00	55.3	74.2	52.2
11/06/2021 16:00	55.3	74.2	52.3
11/06/2021 17:00	56.4	78.7	52.7
11/06/2021 18:00	64.2	97.8	54.4
11/06/2021 19:00	60.5	93.0	58.2
11/06/2021 20:00	67.2	100.0	57.9
11/06/2021 21:00	59.2	69.0	58.0
11/06/2021 22:00	59.0	76.6	58.0
11/06/2021 23:00	71.2	106.4	58.3
12/06/2021 00:00	59.2	65.2	58.2
12/06/2021 01:00	58.8	74.8	58.0
12/06/2021 02:00	57.9	67.6	53.4
12/06/2021 03:00	54.6	66.3	52.4
12/06/2021 04:00	54.0	69.8	52.2
12/06/2021 05:00	54.5	70.4	52.3
12/06/2021 06:00	55.3	80.1	52.2
12/06/2021 07:00	54.4	67.8	52.4
12/06/2021 08:00	55.0	87.1	52.5


Time History Graph Night-LAMax Rear
LAFMax
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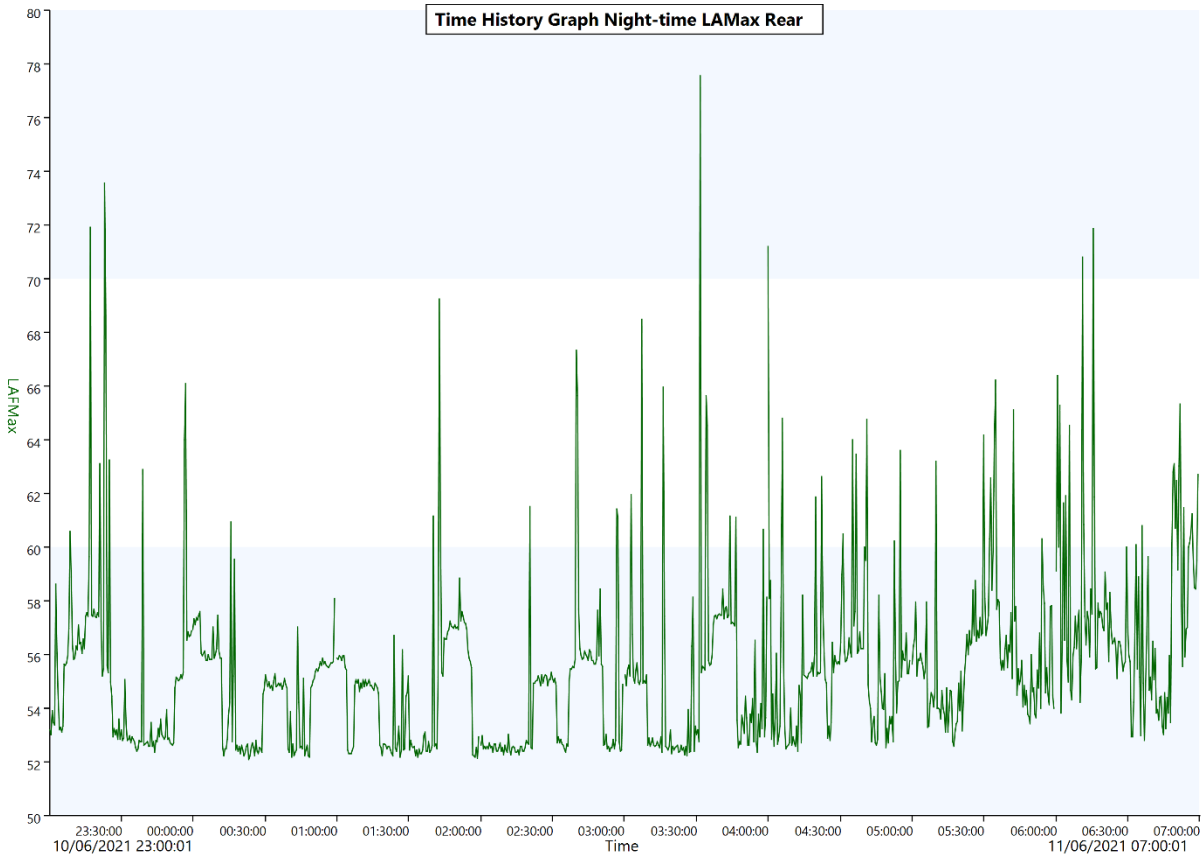
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23:30:00
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05:30:00
06:00:00
06:30:00
07:00:00
10/06/2021 23:00:01
Time
11/06/2021 07:00:01

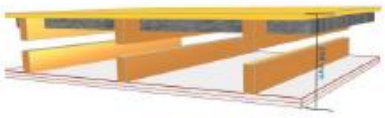
Appendix B – Proposed dividing floor/ceiling structure

Sound Insulation Prediction (v9.0.23)

INSUL

Program copyright Marshall Day Acoustics 2017
Margin of error is generally within Rw ±3 dB
- Key No. 2594
Job Name:
Job No.: Initials info
Date:26/07/2021
File Name:

Notes:



Rw 64 dB
C -3 dB
Ctr -9 dB

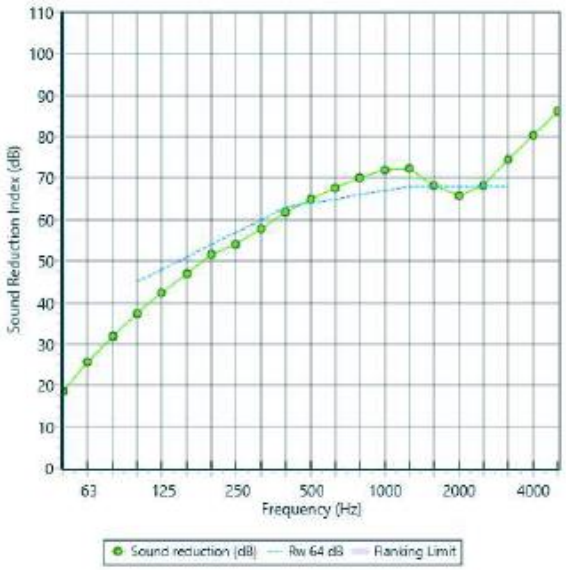
Mass-air-mass resonant frequency = =36 Hz
Panel Size = 2.7 m x 4.0 m
Partition surface mass = 38.7 kg/m²

System description

Panel 1 : 1 x 16 mm Particle Board

Frame: Separate Joists (162 mm x 45 mm), Stud spacing 600 mm ; Cavity Width 250 mm , 1 x Rockwool (33kg/m3) Thickness 50 mm
Panel 2 : 2 x 16 mm Gyproc SoundBloc 15mm

freq.(Hz)	R(dB)	R(dB)
50	18	
63	26	22
80	32	
100	37	
125	42	41
160	47	
200	52	
250	54	54
315	58	
400	62	
500	65	64
630	68	
800	70	
1000	72	71
1250	72	
1600	68	
2000	66	67
2500	68	
3150	74	
4000	80	78
5000	86	



System description

Panel 1 : 1 x 18 mm Particle Board

Frame: Separate Joists (1E2 mm x 45 mm), Stud spacing 600 mm ; Cavity Width 250 mm , 1 x Rockwool (33kg/m3) Thickness 50 mm
Panel 2 : 2 x 15 mm Gyproc SoundBloc 15mm

Appendix C – Wall detail around extraction system

Sound Insulation Prediction (v9.0.23)

INSUL

Program copyright Marshall Day Acoustics 2017
Margin of error is generally within Rw ±3 dB
- Key No. 2594
Job Name:
Job No.: Initials info
Date:26/07/2021
File Name:

Notes:

Rw 59 dB
C -3 dB
Ctr -7 dB

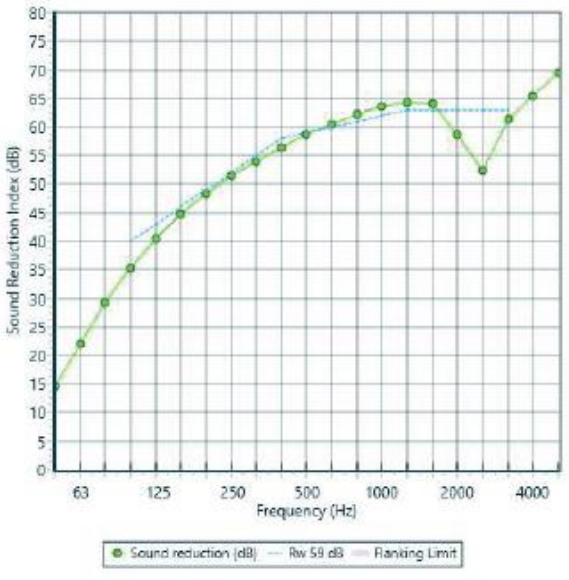
Mass-air-mass resonant frequency = =45 Hz
Panel Size = 2.7 m x 4.0 m
Partition surface mass = 52 kg/m²

System description

Panel 1 : 2 x 16 mm Gyproc SoundBloc 15mm

Frame: Timber stud + Resilient railbar (88 mm x 45 mm); Stud spacing 600 mm ; Cavity Width 100 mm ; 1 x Rockwool (33kg/m3) Thickness 50 mm ...
Panel 2 : 2 x 16 mm Gyproc SoundBloc 15mm

freq.(Hz)	R(dB)	R(dB)
50	15	
63	22	19
80	29	
100	35	
125	40	39
160	45	
200	48	
250	51	51
315	54	
400	56	
500	59	58
630	61	
800	62	
1000	64	63
1250	64	
1600	64	
2000	59	56
2500	52	
3150	61	
4000	65	64
5000	69	



System description

Panel 1 : 2 x 15 mm Gyproc SoundBloc 15mm

Frame: Timber stud + Resilient rail/bar (88 mm x 45 mm), Stud spacing 600 mm ; Cavity Width 100 mm , 1 x Rockwool (33kg/m3) Thickness 50 mm
Panel 2 : 2 x 15 mm Gyproc SoundBloc 15mm