
GREAT GROUNDS LIMITED

NOISE IMPACT ASSESSMENT REPORT

GREAT GROUNDS, OAK TREE FARM, DILHORNE ST10 2PL

Client: Great Grounds Limited

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ST10 2PL**

REPORT VERSION CONTROL:

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P4214-R1-V1	21/07/2022	M. MAY, BSc (Hons), AMIOA	M. J. Malone, BSc (Hons), MIOA	M. J. Malone, BSc (Hons), MIOA
				

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1 INTRODUCTION

- 1.1.1 By instruction from Great Grounds Limited ('the client'), NoiseAir was commissioned to conduct an addendum pre-completion noise assessment (NIA) for a recently developed wedding / function venue (planning reference number SMD/2020/0298) at the location: Great Grounds, Oak Tree Farm, Dilhorne ST10 2PL, herein referred to as the 'development site'.
- 1.1.2 NoiseAir were formerly engaged to produce a NIA, Ref: P4214-R1-V1 (herein referred to as the initial report) regarding a full planning application under the same reference number and addressed the potential level of noise breakout from the site.
- 1.1.3 The initial report reasoned that overall dB $L_{Aeq,T}$ and low frequency dB L_{10} noise levels from associated events, are likely to remain below background dB L_{A90} noise limits at noise sensitive receptor locations given some basic improvements to the building structure, namely providing additional insulation to the roof skylight openings.
- 1.1.4 Further mitigation recommendations were provided in the form a noise limiting device set across low frequency bands 40 Hz – 160 Hz as well as the overall broadband noise level and the production of a noise management plan for the site.
- 1.1.5 Following submission of the initial report, it is understood that significant remedial works have been undertaken in respect of the building fabric which extend further than the basic recommendations outlined within the initial report. The client has advised that this includes closing off skylight openings, construction of an underboard ceiling structure with insulation between that and the existing roof, as well as the replacement of all single glazed windows to double glazed units. These improvements can largely be observed within **Figure 1**, **Figure 2** and **Figure 3** below:



Figure 1: Image of venue prior to remedial works.



Figure 2: Image of venue post to remedial works.



Figure 3: Image of venue post to remedial works.

- 1.1.6 It should be noted that, at the time of writing a fixed noise limiting device is yet to be implemented at the development site and an official noise management plan (in line with section 5 of the initial report) is currently being produced for Local Authority review.
- 1.1.7 This noise report has been prepared specifically to address condition 6 of the associated decision document, (determined on 10/02/2020) which states the requirement of a pre-completion sound test to be conducted prior to the building being used for the purpose of business or social events.
- 1.1.8 This report has therefore been prepared as an addendum report to an existing planning application and should be read in conjunction with the initial report dated 24th May 2020.
- 1.1.9 General limitations with respect to this NIA are presented in **Appendix A**.

2 CONSULTATION AND SCOPE OF WORKS

2.1.1 At the time of writing, general principles regarding assessment have been reviewed by NoiseAir based upon the information relayed directly by the client and what is available on the online planning portal.

2.1.2 Condition 6 of the associated decision document outlines the assessment requirement proposed by the local planning and is reproduced below:

Prior to the building being used for the purpose of business or social event, the mitigation measures set out in section 5 of the Noise Impact Assessment Report shall be completed in full, unless other first agreed in writing with the Local Planning Authority. Pre-completion testing to show compliance with the mitigation scheme should be undertaken prior to first use and NSR 3 compliance levels shall be submitted to the Local Planning Authority for written approval.

2.1.3 As such, in order to assess whether requirements have been achieved, NoiseAir propose that mock conditions, simulating amplified music under typical operations are measured at the above identified measurement location and compared directly against the predicted noise levels presented within the initial report.

2.1.4 Where existing residual noise levels are demonstrated to exceed the event noise level being measured, comprehensive noise modelling will be adopted based upon measurements obtained at the direct point of egress (the façade of the development site). Compliance will then be assessed at the above identified receptor based upon the calculated outcome.

2.1.5 Prior to completion of this report, further attempt was made to establish telephone communication with the local planning authority in order to discuss the proposed assessment methodology; however, at the time this report was released, no contact had been made.

2.2 Noise Survey

2.2.1 To form this assessment, NoiseAir has conducted a primarily attended noise survey to measure noise breakout from the development site under mock operational conditions.

2.2.2 The sound system used for mock operational conditions is displayed within **Figure 4** and was operated by a professional DJ.



Figure 4: Music Setup – Mock Conditions.

- 2.2.3 The primary noise sources assessed are:
- Amplified music playback.
- 2.2.4 The above noise sources have been assessed in relation to the below identified receptors:
- NSR 3, as indicated within the initial report and in accordance with Local Authority requirement stipulated within condition 6 of the associated decision document.

3 ACOUSTIC SURVEY

3.1 Acoustic Survey Details

3.1.1 To conduct the assessment, a series of noise measurements were conducted at the development site on 05/07/22. The approximate position of all measurement locations are demonstrated below within **Figure 5** and are referred to as:

- ML1 – Inside the venue;
- ML2 – Externally, approx. 3 m from the building façade at NSR 3;
- ML3 – Externally, approx. 3 m from the development site north façade;
- ML4 – Externally, approx. 3 m from the development site east building façade; and,
- ML5 – Externally, approx. 5 m from the development site south building façade.

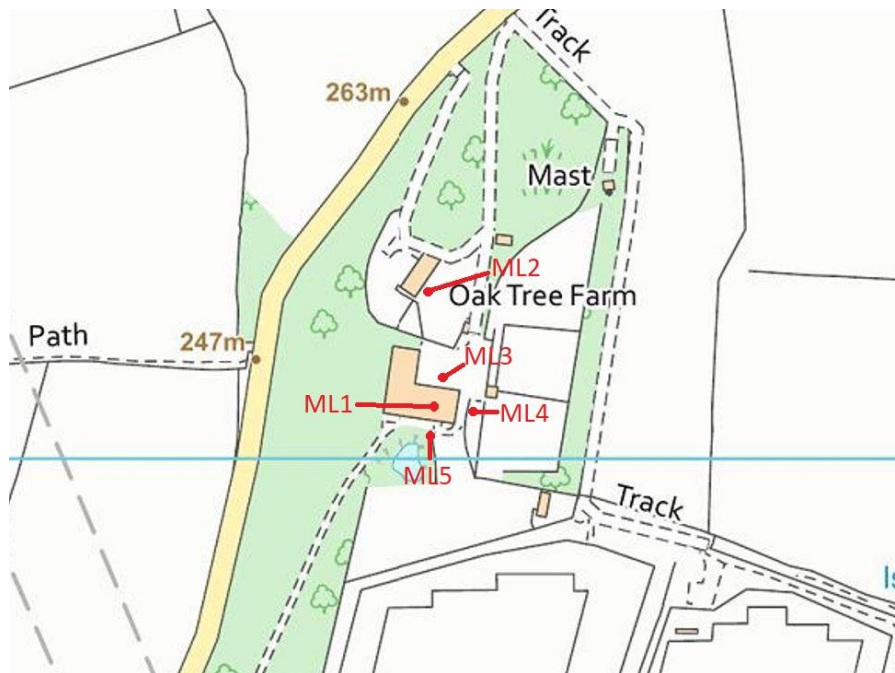


Figure 5: Site layout plan and noise monitoring locations.

Table 1: Summary of Noise Monitoring Locations				
Monitor Location Number	Location Description	Time Period Monitored		Attended or Unattended Monitoring
		Start	End	
ML1	On a tripod, approx. centre to the dance floor area, at an approx. height of 1.5 m from the ground.	05/07/22 10:39	05/07/22 12:45	attended
ML2	On a tripod, approx. 3 m from the building façade at NSR 3, at an approx. height of 2 m from the ground.	05/07/22 10:16	05/07/22 11:15	Attended
ML3	On a tripod, approx. 3 m from the development north façade, at an approx. height of 2 m from the ground.	05/07/22 11:26	05/07/22 11:50	attended
ML4	On a tripod, approx. 3 m from the development east façade, at an approx. height of 2 m from the ground.	05/07/22 11:50 12:38	05/07/22 12:05 12:43	attended
ML5	On a tripod, approx. 5 m from the development south façade, at an approx. height of 2 m from the ground.	05/07/22 12:05 12:44	05/07/22 12:20 12:49	attended

- 3.1.2 ML1 was considered representative of the likely typical event noise level internally within the development site (as advised by the client). Internal noise levels were logged throughout the survey period to simultaneously coincide with external measurements.
- 3.1.3 Monitoring location ML2 was positioned to be representative of noise emissions during the survey period at the receptor location NSR 3, as stipulated by the Local Planning Authority.
- 3.1.4 Monitoring locations ML3, ML4 and ML5 were positioned to monitor the level of noise breakout via the north, east and south building facades, for use in subsequent noise propagation modelling, should the residual noise climate at ML2 exceed the event noise level.
- 3.1.5 The noise measurements were made using Class 1, integrating sound level meters (SLMs).
- 3.1.6 The acoustic equipment was calibrated to comply with Section 4.2 of BS 7445-1:2003¹, before and after the noise monitoring periods.
- 3.1.7 Details of the SLMs and associated field calibration can be found in **Table 2**.

¹ BS7445-2003 "Description and measurement of environmental noise – Part 1: Guide to quantities and procedures.

Table 2: Summary of SLM used for survey and associated field calibration						
SLM (Serial Number)	Preamp (Serial Number)	Microphone (Serial Number)	ML	Start Calibration	End Calibration	Drift
NOR140 (1405015)	NOR1209 (14517)	NOR1225 (42327)	1	-26.2	-26.2	0.0
				Calibrator B&K 4231 / 2699086		
NOR140 (1405016)	NOR1209 (14242)	NOR1225 (118503)	2, 3, 4 & 5	-26.6	-26.6	0.0
				Calibrator B&K 4231 / 2699086		

- 3.1.8 The weather conditions on the day of assessment were noted to be as outlined in **Table 3** below:

Table 3: Summary of weather conditions noted at the start and end of the monitoring duration.	
Parameter	5 th July 2022
Temperature (°C)	13
Wind speed (ms ⁻¹)	< 5.0
Cloud Cover (Approx. %)	90
Humidity (%)	84

- 3.1.9 Attending the development site during the survey monitoring period provided opportunity for observations and detailed notes to be made of the significant noise sources within the residual noise climate, which contribute to each of the externally measured noise levels.

Residual Noise Climate

- 3.1.10 The residual noise climate at the development site was noted to be predominantly that of farm animals and birdsong. Occasional aircraft noise was also noted as a secondary source of noise.

3.2 Measured Sound Levels

- 3.2.1 Measured internal and external noise levels are presented within **Table 4** and **Table 5**.

Table 4: Measured Internal Noise Levels			
Monitoring Location	Run	Time (Duration, mm:ss)	Measured Noise Level
			dB L _{Aeq}
ML1	Run0001	10:39 (05:13)	86.2
	Run0002	10:45 (14:58)	89
	Run0003	11:00 (14:58)	87.3
	Run0004	11:15 (02:28)	87.7
	Run0005	11:34 (00:10)	86.1
	Run0006	11:35 (04:58)	91.3
	Run0007	11:40 (04:58)	87.4
	Run0008	11:45 (04:57)	86.9
	Run0009	11:50 (04:58)	87
	Run0010	11:55 (04:58)	85.6
	Run0011	12:00 (04:57)	88.5
	Run0012	12:05 (04:57)	88.7
	Run0013	12:10 (04:57)	88.6
	Run0014	12:15 (04:57)	88.5

Table 5: Measured External Noise Levels				
Monitoring Location	Description	Run	Time (Duration, mm:ss)	Measured Noise Level
				dB L _{Aeq}
ML2	Residual NSR 3	Run0001	10:16 (15:00)	35.3
	Ambient NSR 3	Run0002	10:42 (02:41)	35.5
		Run0003	11:45 (14:58)	34.8
		Run0004	11:00 (14:57)	34.7
ML3	Residual Façade N of Development	Run0006	11:26 (05:00)	32.2

Table 5: Measured External Noise Levels				
Monitoring Location	Description	Run	Time (Duration, mm:ss)	Measured Noise Level
				dB L _{Aeq}
	Ambient Façade N of Development	Run0007	11:35 (04:30)	44.6
		Run0008	11:40 (04:58)	45.6
		Run0009	11:45 (04:57)	41
ML4	Ambient Façade E of Development	Run0011	11:50 (04:15)	45.2
		Run0012	11:55 (04:58)	45.1
		Run0013	12:00 (04:57)	47.9
	Residual Façade E of Development	Run0023	12:38 (05:00)	40.2
ML5	Ambient Façade S of Development	Run0015	12:05 (04:23)	50.6
		Run0016	12:10 (04:57)	50.3
		Run0017	12:15 (04:57)	50.3
	Residual Façade S of Development	Run0024	12:44 (05:00)	43.0

3.2.2 It can be observed within **Table 5** above, that the residual noise levels measured at ML2 (NSR 3), are at or exceed the ambient event noise.

3.2.3 As such, it is reasoned that further assessment shall be conducted based upon 3D sound propagation modelling, which adopts measured sound levels recorded at the façade of development.

4 3D SOUND MODEL

4.1 Introduction

- 4.1.1 A 3D sound model has been constructed in SoundPLAN™ to calculate the predicted sound pressure levels at selected potential receiver facades. The model uses the calculation method from ISO 9613-2:1996² to account for the distance between the source and receiver and any screening or reflections provided by the surrounding buildings. The model is based on and calibrated against data collected during the survey presented in Section 3.2 of this report.
- 4.1.2 By default, this noise model predicts the noise level that would be generated downwind from the source in question (wind direction within an angle of +/- 45 degrees of the direction connecting the source and receiver, with wind blowing from the source).
- 4.1.3 Ordnance survey contour detail for the site and surrounding area was incorporated into the model to account for any topographic effects such as screening.
- 4.1.4 To reflect the local ground cover, ground absorption was set to 1 (soft ground).
- 4.1.5 The 3D sound model was set to include first order reflections such that the contribution of reflected noise (e.g., from building facades) was accounted for.

4.2 3D Sound Model

- 4.2.1 The 3D noise model specifically includes the following noise sources:
- **Music Noise breakout Development Site** – Music noise breakout has been modelled as a series of area sources, applied directly to the building facades and roof.

Breakout noise has been based upon and the highest combined internal sound pressure level of 89 dB A, measured during the respective monitoring period at measurement location ML3.

As such, the 3D sound model has been calibrated to the combined external sound pressure level measured at location ML3 of 43.9 dB A at approximately 3 m from the building façade, and has been corrected against the residual noise climate.

To conduct a conservative assessment, a uniform noise breakout has been applied across the development.

² ISO9613-2:1996 "Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation"

The average external L_{eq} and L_{10} Spectrum adopted for propagation calculations are presented within **Table 6** and **Table 7** respectively.

Table 6: Table Showing Frequency Spectra – Average Measured dB L_{eq}						
40 Hz	50 Hz	63 Hz	80 Hz	100 Hz	125 Hz	160 Hz
38.9	46.7	47.4	51.8	47.4	37.1	37.1
200 Hz	250 Hz	315 Hz	400 Hz	500 Hz	630 Hz	800 Hz
41.9	38.8	35.2	31.3	34.1	29.8	28.0
1 KHz	1.25 KHz	1.6 KHz	2 KHz	2.5 KHz	3.15 KHz	4 KHz
30.8	27.5	31.4	38.6	34.2	24.9	26.0
5 KHz						
26.6						

Table 7: Table Showing Frequency Spectra – Average Measured dB L_{10}						
40 Hz	50 Hz	63 Hz	80 Hz	100 Hz	125 Hz	160 Hz
41.5	50.3	51.1	55.5	51.3	40.3	41
200 Hz	250 Hz	315 Hz	400 Hz	500 Hz	630 Hz	800 Hz
45.1	42.0	38.3	34.3	37.3	32.8	31.0
1 KHz	1.25 KHz	1.6 KHz	2 KHz	2.5 KHz	3.15 KHz	4 KHz
34.5	30.0	34.5	42.3	35.5	26.7	26.9
5 KHz						
26.3						

- 4.2.2 A noise contour plot illustrating the propagation of the sound from source to receptor NSR 3 (L_{Aeq}) is given in **Figure 6**.

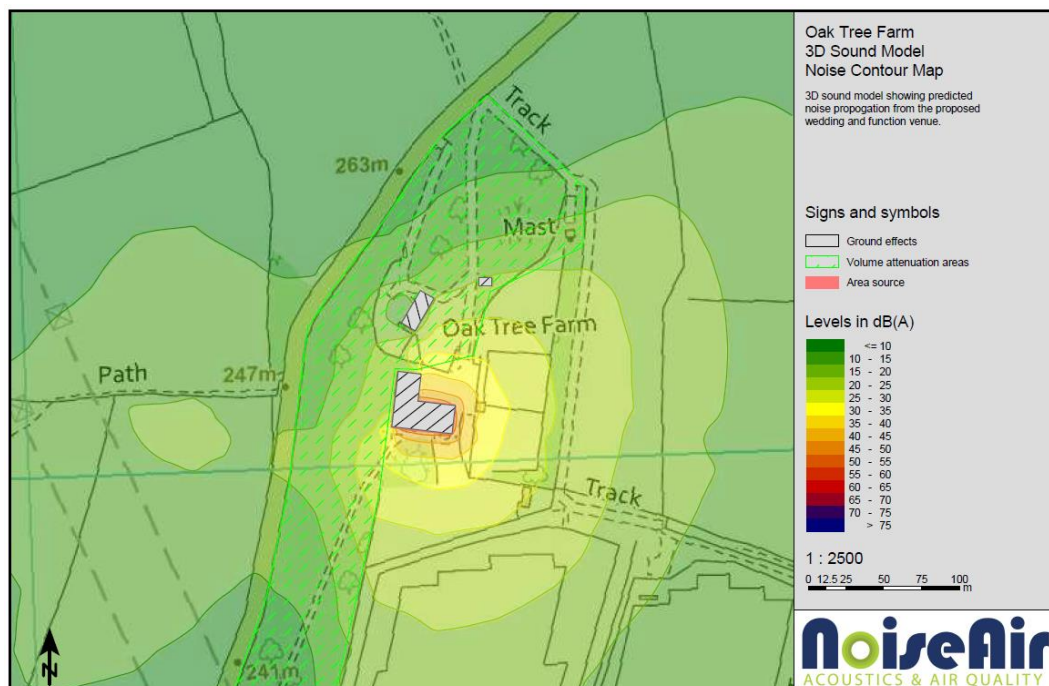


Figure 6: Noise contour plot illustration of the predicted propagation – $L_{Aeq,T}$.

4.2.3 Calculated noise levels at NSR 3 are presented in **Figure 7**.

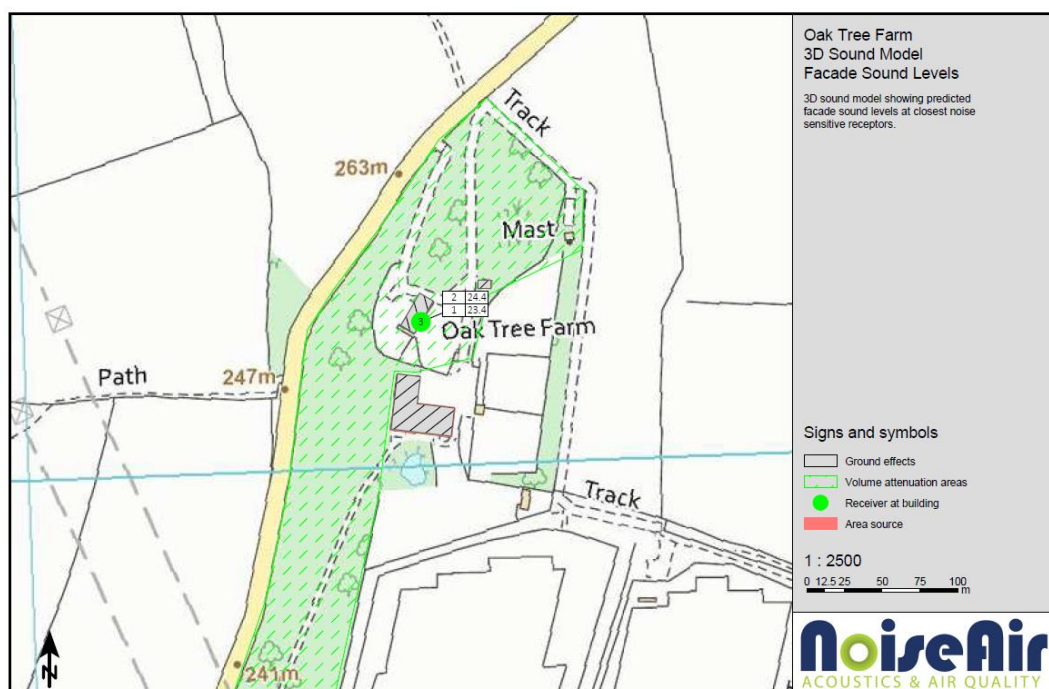


Figure 7: Illustration of the 3D sound model calculated noise levels.

4.2.4 **Table 8** below details the worst-case predicted noise levels ($L_{Aeq,T}$) at the selected façade receptor location (across all floors) and includes calculated L_{10} sound pressure levels between the 40 Hz and 160 Hz octave bands.

Table 8: Calculated Receptor Noise Levels		
Receptor	Noise Index	dB L ₁₀
NSR 3	40 Hz 1/3 Octave Band (Linear)	10.6
	50 Hz 1/3 Octave Band (Linear)	19.4
	63 Hz 1/3 Octave Band (Linear)	20.1
	80 Hz 1/3 Octave Band (Linear)	24.5
	100 Hz 1/3 Octave Band (Linear)	15.7
	125 Hz 1/3 Octave Band (Linear)	4.6
	160 Hz Octave Band (Linear)	5.2
dB L _{Aeq}		24.4

5 NOISE IMPACT ASSESSMENT

- 5.1.1 Based on the results of the 3D sound model presented with **Table 8**, an assessment has been made in respect of the calculated music noise levels at the receptor NSR 3, as stipulated by the Local Authority.
- 5.1.2 **Table 9** presents the calculated noise outcome in comparison to the predicted noise levels detailed within the initial report.

Table 9: Noise Impact Assessment Report				
Receptor	Noise Index	dB L ₁₀ (Initial Report)	dB L ₁₀ (Pre-Completion)	
NSR 3	40 Hz 1/3 Octave Band (Linear)	29	10.6	-18.4
	50 Hz 1/3 Octave Band (Linear)	30.2	19.4	-10.8
	63 Hz 1/3 Octave Band (Linear)	27.5	20.1	-7.4
	80 Hz 1/3 Octave Band (Linear)	19.4	24.5	+5.1
	100 Hz 1/3 Octave Band (Linear)	9	15.7	+6.7
	125 Hz 1/3 Octave Band (Linear)	5.7	4.6	-1.1
	160 Hz Octave Band (Linear)	<0	5.2	>5.2
dB L _{Aeq}		30	24.4	-5.6

5.2 Outcome/Discussion

- 5.2.1 Results demonstrate that overall music noise levels (dB A) are likely to remain below the predicted noise levels at NSR 3 presented within the initial report.
- 5.2.2 As such it is considered that overall music noise levels will remain below the background sound level reasoned within the initial report (22 dB L_{A90}) at all other nearby noise sensitive receptors.
- 5.2.3 It should be noted that although this noise impact assessment is based upon an operational internal sound level of 89 dB(A), given the margin which the overall noise level is calculated

to remain below the predicated level detailed within the initial report, it is reasoned that results will likely remain satisfactory with a music noise limit of 90 dB A.

- 5.2.4 In respect of low frequency noise levels between the octave bands 40 Hz – 160 Hz, results demonstrate that noise levels may on occasion, exceed the predicated noise levels presented within the initial report at around 80 Hz and 100 Hz at NSR 3.
- 5.2.5 Given the level of excess and the additional distance between NSR 3 and the next closest noise sensitive receptor is over 300 m, it is considered unlikely that low frequency noise will be audible based on the parameters of this assessment.
- 5.2.6 This Noise Impact Assessment therefore reasons that music noise is likely to be inaudible internally at nearby noise sensitive receptors, non-incidental to the development.

6 RECOMMENDATIONS

- 7 It is reasoned that noise levels will likely fluctuate from one event to the next (depending on the precise equipment used, the arrangement of this equipment, the prevailing weather conditions and the levels setting etc.).
- 7.1.1 NoiseAir therefore recommend that, irrespective of the findings reasoned within this report, a noise limiting device set across low frequency bands 40 Hz – 160 Hz as well as the overall broadband noise level should be installed at the development.
- 7.1.2 It is recommended that limits are set as to not exceed the levels within this report when measured or calculated at location NSR 3, along with a noise management plan (approved in writing by the local authority) to ensure that best practice is employed at the development. As part of the noise management plan, (as a minimum) the use of subwoofers should be prohibited, windows and doors should remain closed other than for entry and exit and a 24 hour complaints procedure should be established.

8 CONCLUSION

- 8.1.1 By instruction from Great Grounds Limited ('the client'), NoiseAir was commissioned to conduct an addendum pre-completion noise assessment (NIA) for a recently developed wedding/ function venue (planning reference number SMD/2020/0298) at the location: Great Grounds, Oak Tree Farm, Dilhorne ST10 2PL, herein referred to as the 'development site'.
- 8.1.2 NoiseAir were formerly engaged to produce a NIA, Ref: P4214-R1-V1, regarding a full planning application under the same reference number and addressed the potential level of noise breakout from the site.
- 8.1.3 Report P4214-R1-V1 reasoned that overall dB $L_{Aeq,T}$ and low frequency dB L_{10} noise levels from associated events, are likely to remain below background dB L_{A90} noise limits at noise sensitive receptor locations given some basic improvements to the building structure.
- 8.1.4 The Local Planning Authority has subsequently requested that pre-completion testing be conducted to demonstrate compliant noise levels, specifically with reference to NSR 3, as identified within P4214-R1-V1.
- 8.1.5 Results demonstrate that overall music noise levels (dB(A)) are likely to remain below the predicted noise levels at NSR 3 presented within the initial report.
- 8.1.6 As such it is considered that overall music noise levels will remain below the background sound level reasoned within the initial report (22 dB L_{A90}) at all other nearby noise sensitive receptors.
- 8.1.7 Results of low frequency noise levels between the octave bands 40 Hz – 160 Hz, demonstrate that noise levels may on occasion, exceed the predicated noise levels presented within the initial report at around 80 Hz and 100 Hz at NSR 3; however, given the level of excess and the additional distance between NSR 3 and the next closest noise sensitive receptor is over 300 m, it is considered unlikely that low frequency noise will be audible internally at nearby noise sensitive receptors, non-incident to the development.
- 8.1.8 Further recommendations are outlined within section 7 of this report which are based around the installation of a sound limiting device and noise management plan.

APPENDIX A - REPORT LIMITATIONS

This Report is presented to Great Grounds Limited and may not be used or relied on by any other person or by the client in relation to any other matters not covered specifically by the scope of this report.

Notwithstanding anything to the contrary contained in the report, NoiseAir Limited is obliged to exercise reasonable skill, care and diligence in the performance of the services required by Great Grounds Limited and NoiseAir shall not be liable except to the extent that it has failed to exercise reasonable skill, care and diligence, and this report shall be read and construed accordingly.

This report has been prepared by NoiseAir Limited. No individual is personally liable in connection with the preparation of this report. By receiving this report and acting on it, the client or any other person accepts that no individual is personally liable whether in contract, tort, for breach of statutory duty or otherwise.

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Where assessments of works or costs identified in this report are made, such assessments are based upon the information available at the time and where appropriate are subject to further investigations or information which may become available.

Where / if estimates and projects are made within this report, are made based on reasonable assumptions as of the date of this report, such statements however by their very nature involve risks and uncertainties that could cause actual results to differ materially from the results predicted. NoiseAir Limited specifically does not guarantee or warrant any estimates or projects contained in this report.

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APPENDIX B - GLOSSARY

A-weighted sound pressure, p_A	Value of overall sound pressure, measured in pascals (Pa), after the electrical signal derived from a microphone has been passed through an A-weighting network. <i>NOTE: The A-weighting network modifies the electrical response of a sound level meter with frequency in approximately the same way as the sensitivity of the human hearing system.</i>
A-weighted sound pressure level, L_{pA}	Quantity of A-weighted sound pressure in decibels (dBA).
Acoustic environment	Sound from all sound sources as modified by the environment [BS ISO 12913-1:2013].
Ambient sound	Totally encompassing sound in a given situation at a given time, usually composed of sound from many sources near and far. <i>NOTE: The ambient sound comprises the residual sound and the specific sound when present.</i>
Ambient sound level, $L_a = L_{Aeq,T}$ (BS 4142:2014)	Equivalent continuous A-weighted sound pressure level of the totally encompassing sound in a given situation at a given time, usually from many sources near and far, at the assessment location over a given time interval, T <i>NOTE: The ambient sound level is a measure of the residual sound and the specific sound when present.</i>
Background sound	Underlying level of sound over a period, T, which might in part be an indication of relative quietness at a given location.
Background sound level, $L_{A90,T}$ (BS 4142:2014)	A-weighted sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given time interval, T, measured using time weighting F and quoted to the nearest whole number of decibels.
Break-in	Noise transmission into a structure from outside.
Break-out	Noise transmission from inside a structure to the outside.
Cross-talk	Noise transmission between one room and another room or space via a duct or other path.
C_{tr}	Correction term applied against the sound insulation single-number values (R_w , D_{w1} , and $D_{nT,w}$) to provide a weighting against low frequency performance. <i>NOTE: The reference values used within the C_{tr} calculation are based on urban traffic noise.</i>
Equivalent continuous A-weighted sound pressure level, $L_{Aeq,T}$	Value of the A-weighted sound pressure level in decibels (dB) of a continuous, steady sound that, within a specified time interval, T, has the same mean-squared sound pressure as the sound under consideration that varies with time.
Equivalent continuous A-weighted sound pressure level, $L_{Aeq,T}$ (BS 4142:2014)	Value of the A-weighted sound pressure level in decibels of continuous steady sound that, within a specified time interval, $T = t_2 - t_1$, has the same mean-squared sound pressure as a sound that varies with time.
Equivalent sound absorption area of a room, A	Hypothetical area of a totally absorbing surface without diffraction effects, expressed in square metres (m ²), which, if it were the only absorbing element in the room, would give the same reverberation time as the room under consideration
Facade level	Sound pressure level 1 m in front of the façade. <i>NOTE: Facade level measurements of L_{pA} are typically 1 dB to 2 dB higher than corresponding free-field measurements because of the reflection from the facade.</i>
Free-field level	Sound pressure level away from reflecting surfaces. <i>NOTE: Measurements made 1.2 m to 1.5 m above the ground and at least 3.5 m away from other reflecting surfaces are usually regarded as free-field. To minimize the effect of reflections the measuring position has to be at least 3.5 m to the side of the reflecting surface (i.e., not 3.5 m from the reflecting surface in the direction of the source). Estimates of noise from aircraft overhead usually include a correction of 2 dB to allow for reflections from the ground.</i>

Impact sound pressure level, L_i	Average sound pressure level in a specific frequency band in a room below a floor when it is excited by a standard tapping machine or equivalent.
Indoor ambient noise	Noise in a given situation at a given time, usually composed of noise from many sources, inside and outside the building, but excluding noise from activities of the occupants. <i>NOTE: The location(s) within the room at which the ambient indoor noise is to be measured or calculated ought to be considered.</i>
Measurement time interval, T_m (BS 4142:2014)	Total time over which measurements are taken. <i>NOTE: This may consist of the sum of a number of non-contiguous, short-term measurement time intervals.</i>
Noise criteria	Numerical indices used to define design goals in a given space.
Noise rating, NR	Graphical method for rating a noise by comparing the noise spectrum with a family of noise rating curves.
Normalised impact sound pressure level, L_n	Impact sound pressure level normalized for a standard absorption area in the receiving room. <i>NOTE: Normalised impact sound pressure level is usually used to characterize the insulation of a floor in a laboratory against impact sound in a stated frequency band.</i>
Octave band	Band of frequencies in which the upper limit of the band is twice the frequency of the lower limit.
Percentile level, $L_{AN,T}$	A-weighted sound pressure level obtained using time-weighting "F", which is exceeded for $N\%$ of a specified time interval.
Reference time interval, T_r (BS 4142:2014)	Specified interval over which the specific sound level is determined. <i>NOTE: This is 1 h during the day from 07:00 h to 23:00 h and a shorter period of 15 min at night from 23:00 h to 07:00 h.</i>
Residual sound (BS 4142:2014)	Ambient sound remaining at the assessment location when the specific sound source is suppressed to such a degree that it does not contribute to the ambient sound.
Residual sound level, $L_r = L_{Aeq,T}$ (BS 4142:2014)	Equivalent continuous A-weighted sound pressure level of the residual sound at the assessment location over a given time interval, T .
Rating level, L_{Ar,T_r}	Equivalent continuous A-weighted sound pressure level of the noise, plus any adjustment for the characteristic features of the noise. <i>NOTE: This is used in BS 7445 and BS 4142 for rating industrial noise, where the noise is the specific noise from the source under investigation.</i>
Reverberation time, T	Time that would be required for the sound pressure level to decrease by 60 dB after the sound source has stopped.
Sound exposure level, L_{AE}	Level of a sound, of 1 s duration, that has the same sound energy as the actual noise event considered.
Sound level difference, D	Difference between the sound pressure level in the source room and the sound pressure level in the receiving room.
Sound pressure, p	Root-mean-square value of the variation in air pressure, measured in pascals (Pa) above and below atmospheric pressure, caused by the sound.
Sound pressure level, L_p	Quantity of sound pressure, in decibels (dB).
Sound reduction index, R	Laboratory measure of the sound insulating properties of a material or building element in a stated frequency band.

Specific sound level, $L_s = L_{Aeq,T_r}$ (BS 4142:2014)	Equivalent continuous A-weighted sound pressure level produced by the specific sound source at the assessment location over a given reference time interval, T_r .
Specific sound source (BS 4142:2014)	Sound source being assessed.
Standardised impact sound pressure level, L'_{nT}	Impact sound pressure level normalized to a reverberation time in the receiving room of 0.5 s.
Standardised level difference, D_{nT}	Difference in sound level between a pair of rooms, in a stated frequency band, normalized to a reference reverberation time of 0.5 s for dwellings.
Groundborne noise	Audible noise caused by the vibration of elements of a structure, for which the vibration propagation path from the source is partially or wholly through the ground. <i>NOTE Common sources of ground-borne noise include railways and heavy construction work on adjacent construction sites.</i>
Structure-borne noise	Audible noise caused by the vibration of elements of a structure, the source of which is within a building or structure with common elements. <i>NOTE Common sources of structure-borne noise include building services plant, manufacturing machinery and construction or demolition of the structure.</i>
Third octave band	Band of frequencies in which the upper limit of the band is 2% times the frequency of the lower limit.
Weighted level difference, D_w	Single-number quantity that characterizes airborne sound insulation between rooms, but which is not adjusted to reference conditions. <i>NOTE Weighted level difference is used to characterize the insulation between rooms in a building as they are. Values cannot normally be compared with measurements made under other conditions (see BS EN ISO 717-1).</i>
Weighted normalised impact sound pressure level, $L'_{n,w}$	Single-number quantity used to characterize the impact sound insulation of floors over a range of frequencies.
Weighted sound reduction index, R_w	Single-number quantity which characterizes the airborne sound insulating properties of a material or
Weighted standardised impact sound pressure level $L'_{nT,w}$	Single-number quantity used to characterize the impact sound insulation of floors over a range of frequencies.
Weighted standardised level difference, $D_{nT,w}$	Single-number quantity that characterizes the airborne sound insulation between rooms.

Symbols

D_w	Weighted level difference (dB)
D_{nT}	Standardized level difference (dB)
$D_{nT,w}$	Weighted standardized level difference (dB)
L_{Amax}	Maximum noise level (dB)
$L_{Ar,Tr}$	Rating level (dB)
L_n	Normalised impact sound pressure level (dB)
L'_{nT}	Standardised impact sound pressure level (dB)
$L'_{nT,w}$	Weighted standardised impact sound pressure level (dB)
$L'_{n,w}$	Weighted normalised impact sound pressure level (dB)
L_p	Sound pressure level (dB)
L_{pA}	A-weighted sound pressure level (dB)
$L_{AN,T}$	Percentile level (dB)
L_{AE}	Sound exposure level (dB)
$L_{Aeq,T}$	Equivalent continuous A-weighted sound pressure level (dB)
p	Sound pressure (Pa)
p_A	A-weighted sound pressure (dB)
$p_{A(t)}$	Instantaneous A-weighted sound pressure (Pa)

R	Sound reduction index (dB)
R_w	Weighted sound reduction index (dB)
T	Time interval (also used for reverberation time) (s)
t_0	Reference time interval (s)

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TEL. 0116 272 5908

EMAIL. INFO@NOISEAIR.CO.UK

