



POZZONI

**CHEETHAM HILL RETAIL PARK, QUEENS ROAD,
MANCHESTER**

NOISE ASSESSMENT FOR PLANNING PURPOSES

27 November 2020

AEC REPORT: P4229/R01/WJK

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1.0 INTRODUCTION

- 1.1 Acoustic & Engineering Consultants Limited (AEC) has been appointed by Pozzoni to carry out a noise impact assessment in relation to the variation of planning permission 124866/JO/20190 at Cheetham Hill Retail Park, Queens Road, Manchester.
- 1.2 The assessment is required to discharge condition 18 included in the planning decision notice (Ref: 125490/JO/2019) to allow for a mezzanine level within retail unit A1 at Cheetham Hill Retail Park to be used as a gym and health and fitness gym (Class D2).
- 1.3 This report presents details of the noise levels measured on site and references information contained in previous noise assessments carried out by others in relation to the development and provides an assessment of the potential impact on the acoustic design of the building in accordance with the requirements of the planning conditions.
- 1.4 Acoustic terminology used throughout the report is described in brief in Appendix A.

2.0 BACKGROUND AND SITE DESCRIPTION

- 2.1 Planning permission for the development is provided in the Decision Notice dated 29 June 2020 and is subject to the following condition relating to noise:

18) Notwithstanding Noise Assessment prepared by Miller Goodall (ref. 102194) stamped as received by the City Council, as Local Planning Authority on the 7 February 2020 and Noise Assessment addendum prepared by Miller Goodall (102194-2 Addendum) stamped as received by the City Council, as Local Planning Authority on the 4 May 2020, (a) prior to the first use of the unit A3 (gym) as indicated on drawing CPS16-068 006 H stamped as received by the City Council, as Local Planning Authority, on the 19 May 2020, a scheme of acoustic insulation shall be submitted for approval in writing by the City Council, as Local Planning Authority.

Where entertainment noise is proposed the L_{Aeq} shall be controlled to 10dB below the L_{A90} (without entertainment noise) in each octave band at the façade of the nearest noise sensitive location.

The approved scheme shall then be implemented and retained and maintained for as long as the development remains in use.

(b) Within two months of the first use of unit A3 (gym), a verification report shall be submitted for approval in writing by the City Council, as Local Planning Authority, in order to validate that the work undertaken conforms to the recommendations and requirements approved as part of part (a) of this planning condition. The verification report shall include post completion testing to confirm the noise criteria has been met. In instances of non-conformity, these shall be detailed along with mitigation measures required to ensure compliance with the noise criteria. Any mitigation measures shall be implemented in accordance with a timescale to be agreed with the City Council, as Local Planning Authority, and thereafter retained and maintained in situ.

- 2.2 The development is located within an existing retail park, above and adjacent to three new retail units within an existing structure. The nearest noise sensitive properties are located on Queens Road, directly to the north and shown on Figure 1.

- 2.3 The proposed gym is to consist of cardio equipment, free weights area, fitness studios and functional spaces. A plan showing the proposed fit out of the gym is provided in Figure 2.
- 2.4 It is understood that although the proposed gym and health and fitness gym would operate 24 hours per day, Monday to Sunday, there would be amplified music between 0700h and 2300h.

3.0 BASELINE NOISE LEVELS

- 3.1 Baseline noise levels were reported in the previous Miller Goodall noise assessment (Ref: 102194) as part of the planning application. The baseline noise levels were obtained from a noise assessment undertaken in 2018 by Aecom for the LIDL development, (Ref: 60323172).
- 3.2 The noise assessment is based on octave band noise data obtained from the lowest measured background noise levels at a location representative of the nearest residential properties to the gym on Queens Road. The background noise levels are representative of the period when amplified music could be played in the gym up to 2300h. The lowest octave band background noise data used in the assessment from the Aecom data is shown in Table 1, below.

Table 1 – Octave band background noise levels

Index	Octave Band Centre Frequency, Hz							dBA
	63	125	250	500	1k	2k	4k	
L _{A90,15min}	54	50	48	45	47	42	32	50

4.0 ASSESSMENT

Source Noise Levels

- 4.1 For the purposes of this assessment, noise levels previously measured by AEC at a gym during an exercise class with amplified music have been used. Although the overall A-weighted noise level is similar to those reported, the frequency spectrum differs slightly from the Miller Goodall assessment which uses octave band levels from a busy pub / bar. The octave band source noise levels used in the calculations are shown in the following Table 2:

Table 2 – Gym noise, dBL_{eq}

Activity	Octave Band Centre Frequency, Hz							dBA
	63	125	250	500	1k	2k	4k	
Exercise Class with Amplified music	83	86	83	89	85	77	69	89

Predicted Noise Levels

- 4.2 The following assumptions have been made in the calculations based on information provided by Pozzoni and site contractor.
- The existing roof construction is a Kalzip system consisting of 1mm aluminium outer and inner sheets and 150mm insulation quilt. The existing façade consists of a 0.5mm steel outer sheet, 100mm insulation quilt and 0.5mm steel with Kingspan KS 1000 45mm inner leaf panels as reported in the Miller Goodall report. These constructions have been confirmed by the construction contractor. For the purposes of this assessment, the SRI data from a similar Kalzip roof system has been used.
 - The existing roof lights are to be replaced with the Kalzip roof system.
 - The external facade is to be lined internally with 12.5mm wall board.
 - Amplified music will only be played in the studio, spin and flex spaces (refer to the attached Figure 2).
 - The internal partitions are a minimum metal stud partition with 12.5mm plasterboard each side with no suspended ceiling.
- 4.3 The octave band source noise data has been used to calculate noise levels from the proposed gym at the nearest noise sensitive properties, considering the sound reduction performance for each building element and distance attenuation. The sound reduction performances used in the calculations are provided in the following Table 3. A -3dB correction has been applied to each element in the calculations to account for the onsite performance.

Table 3 – Building Element Sound Reduction Index, dB

Building Element	Octave Band Centre Frequency, Hz						
	63	125	250	500	1k	2k	4k
Roof	12	13	27	42	49	52	59
Façade	15	16	30	49	77	90	97
Internal Studio Partitions	14*	15	24	32	43	43	38

*Assumed performance

- 4.4 The predicted noise level at the nearest noise sensitive properties and assessment against the Local Authority criteria from activities with amplified music are shown in Table 4, below. An example noise breakout calculation is provided in Appendix B.

Table 4 – Noise Breakout Assessment for Typical Gym Studio Noise Levels

Element	Description	Octave Band Centre Frequency, Hz						
		63	125	250	500	1k	2k	4k
Internal Wall / Façade	Source (Amplified Music)	83	86	83	89	85	77	69
	Predicted internal noise level at façade (via the studio walls)	54	56	44	42	27	20	16
	Predicted Noise Level at Receiver	22	23	-3	-24	-67	-87	-98
Roof	Predicted Noise Level at Receiver	49	51	34	25	14	4	-12
Total		49	51	34	25	14	4	-12
Local Authority Criteria (L ₉₀ minus 10dB)		44	40	38	35	37	32	22
Noise level assessment		5	11	-4	-10	-23	-28	-34

- 4.5 For typical gym studio noise levels, the assessment indicates that the Local Authority criteria of 10dB below the L_{A90} (without entertainment noise) in each octave band at the façade of the nearest noise sensitive location would not be achieved in the 63Hz, 125Hz and 250Hz octave bands based on the existing building envelope. As such, mitigation would be required in the form of limiting amplified music noise levels in the studio spaces or improving the building envelope.
- 4.6 The calculations show that the dominant sound transmission path is through the roof. In order to achieve the Local Authority criteria, music noise levels should not exceed the levels in the octave bands shown in Table 5, below:

Table 5 – Maximum allowable amplified music noise levels in the studio, dBL_{eq}

Octave Band Centre Frequency, Hz		
63	125	250
68	71	77

- 4.7 Alternatively, for areas where amplified music is proposed, suspended ceilings can be considered to control noise breakout from the roof. Higher amplified music noise levels than those specified in Table 5 and comparable with typical noise levels shown in Table 2 would be achieved by undrawing the roof using 2 layers of 12.5mm Soundbloc with a 300mm cavity filled with mineral wool, as shown in Figure 3.
- 4.8 Background music may be played in the free weights area provided music noise levels do not exceed the limits in each octave band shown in Table 5, below:

Table 5 – Maximum allowable music noise levels – Free weights area

Octave Band Centre Frequency, Hz						
63	125	250	500	1k	2k	4k
61	58	70	82	92	90	87

- 4.9 Based on measurements undertaken by AEC in free weights and exercise machine areas of other non-related gyms the above noise levels would not be exceeded.
- 4.10 Within two months of first use, a post completion test will be carried out to confirm that the works conform to the recommendations contained in this report and that the Local Authority noise criteria has been met.

5.0 SUMMARY AND CONCLUSION

- 5.1 Acoustic & Engineering Consultants Limited (AEC) has been appointed by Pozzoni to carry out a noise impact assessment in order to discharge condition 18 provided in the planning decision notice (Ref: 125490/JO/2019) to allow for a mezzanine level within retail unit A1 at Cheetham Hill Retail Park to be used as a gym and health and fitness gym (Class D2).
- 5.2 A noise assessment has been carried out to determine the noise breakout from the proposed gym from amplified music and assessed against the Local Authority criteria at the nearest noise sensitive properties on Queens Road.
- 5.3 The calculations indicate that the dominant sound transmission path is via the roof for the Spin, Studio and Flex spaces (as these are located central to the gym).
- 5.4 Allowable octave band noise levels for amplified music within the gym have been calculated and are identified above. Provided that these stated noise limits are achieved, the Local Authority criteria will be achieved at the nearest residential receivers.
- 5.5 Based on noise level measurements undertaken in gyms in relation to previous non-related projects it is highly improbable that the allowable internal noise levels would be exceeded in the free weights / exercise machine areas of the gym (where it is assumed that no classes with amplified music occur).
- 5.6 However, if the operator wishes to have higher amplified music noise levels in the Spin, Studio and Flex areas, noise breakout via the roof can be controlled through the installation of suspended ceilings.
- 5.7 A post completion test will be carried out within two months of first use to confirm that the Local Authority criteria has been met, in accordance with condition 18 of the planning decision notice.

FIGURE 1 – Proposed Development



FIGURE 2 – Proposed Fit Out

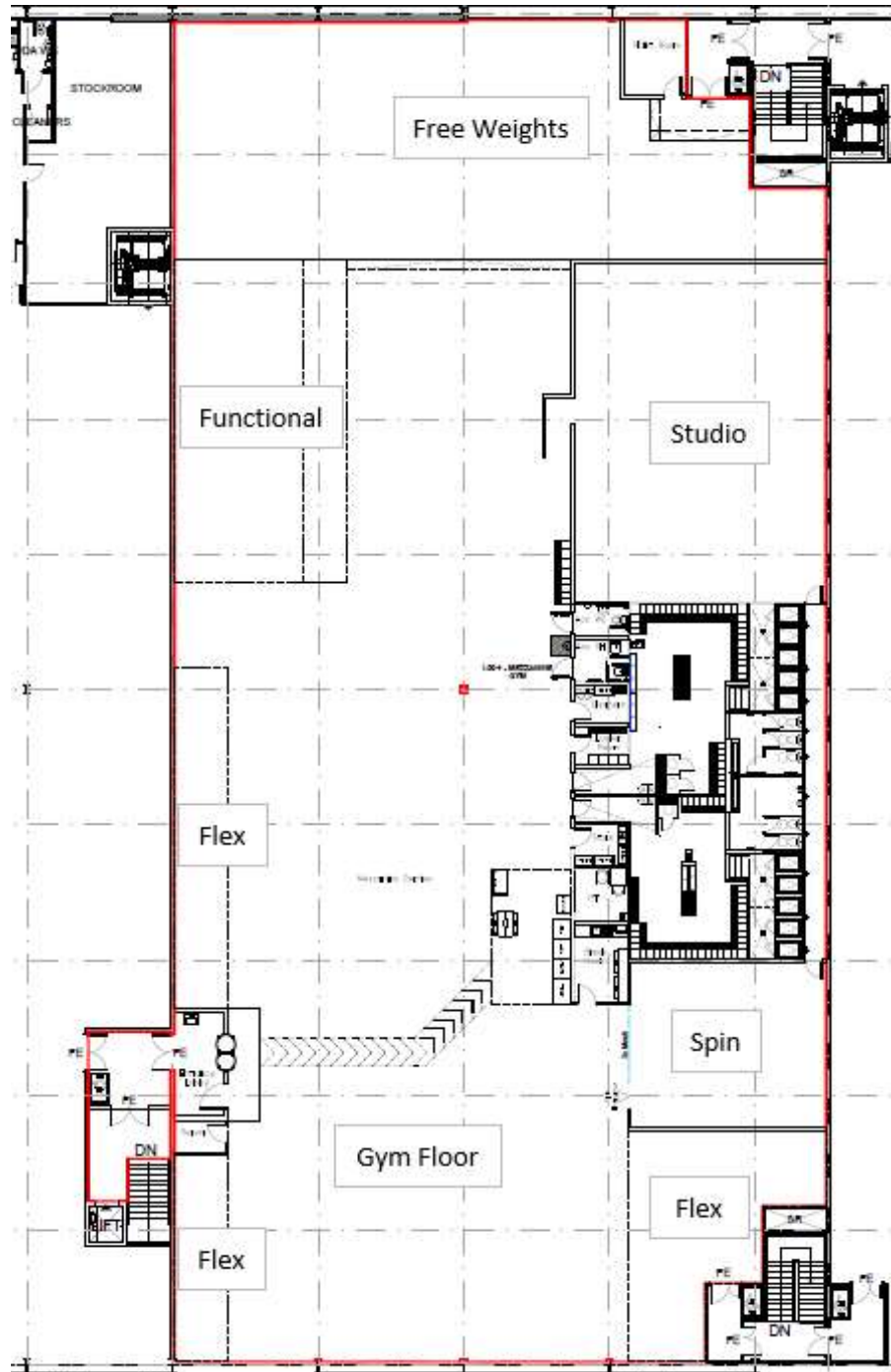
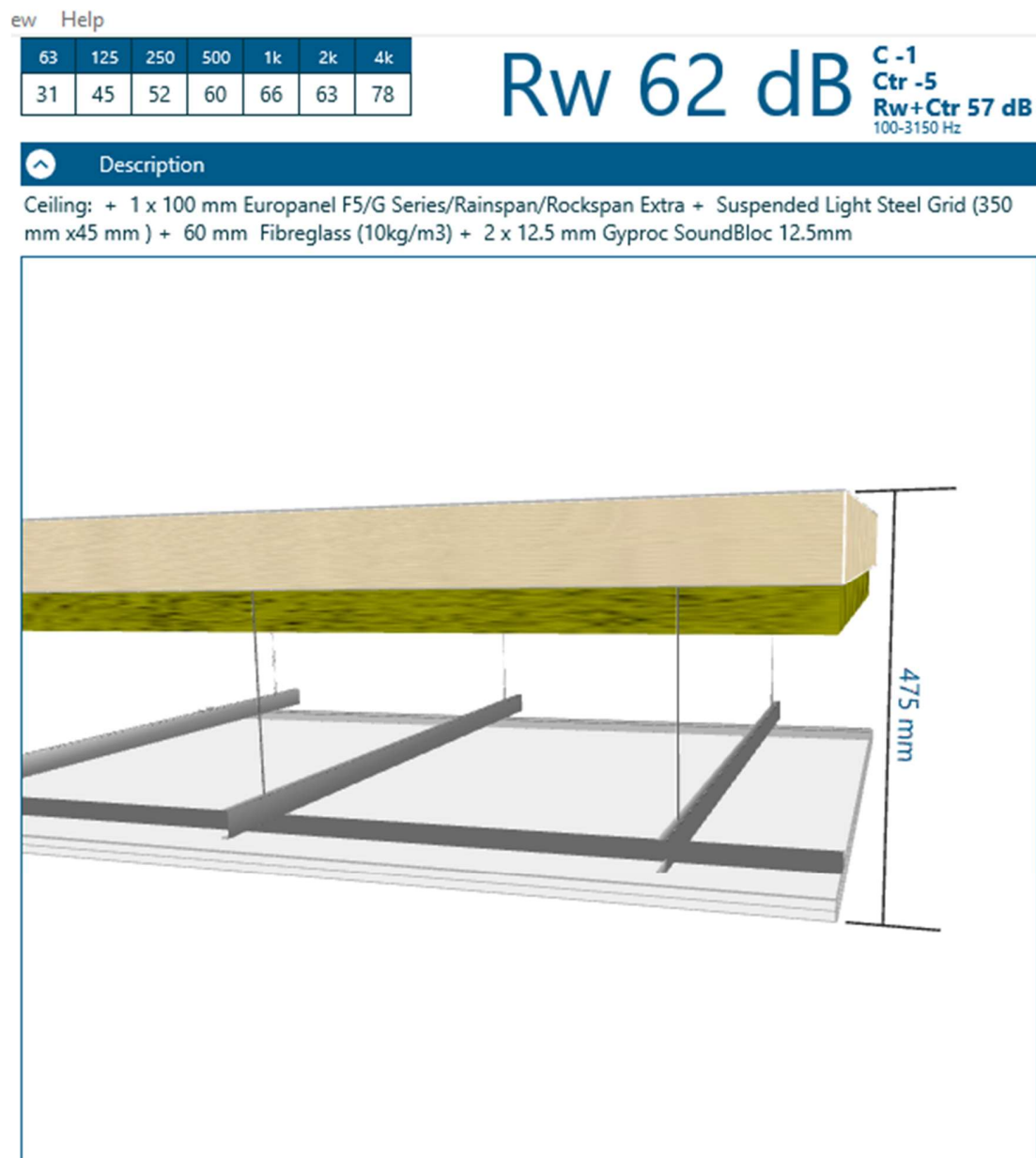


FIGURE 3 – Suggested Roof Construction



APPENDIX A – Acoustic Terminology in Brief

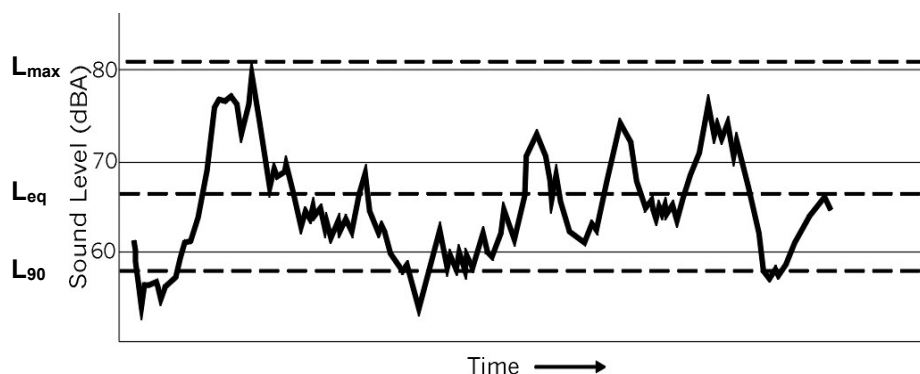
Sound is produced by mechanical vibration of a surface, which sets up rapid pressure fluctuations in the surrounding air. The rate at which the pressure fluctuations occur determines the pitch or *frequency* of the sound. The frequency is expressed in Hertz (*Hz*), that is, cycles per second. The human ear is sensitive to sounds from about 20 Hertz to 20,000 Hertz. Although sound can be of one discrete frequency - a 'pure tone' - most sound is made up of many different frequencies.

The human ear is more sensitive to some frequencies than others, and modern instruments can measure sound in the same subjective way. This is the basis of the A-weighted sound pressure level *dBA*, normally used to assess the effect of noise on people. The dBA weighting emphasises or reduces the importance of certain frequencies within the audible range.

Sound Units

In order to assess environmental noise, measurements are carried out by sampling over specific periods of time, such as fifteen minutes or one hour, the statistically determined results being used to quantify various aspects of the sound.

The figure below shows an example of sound level varying with time. Because of this time variation the same period of sound can be described by several different levels. The most common of these are described below. It should be noted that in many instances in the main body of text, the unit will be preceded by a dB descriptor in the report e.g. $L_{Aeq,T}$ could be written $dBL_{Aeq,T}$



Example of Sound Level Varying With Time

- $L_{Aeq,T}$** The equivalent continuous (A-weighted) sound level. It may be thought of as the "average" sound level over a given time, T. It is used for assessing noise from various sources: industrial and commercial premises, construction sites, railways and other intermittent noises and can be considered as the "ambient" noise level.
- $L_{A10,T}$** The (A-weighted) sound level exceeded for 10% of a measurement period. It is the value often used to describe traffic noise.

L_{A90,T}	The (A-weighted) sound level exceeded for 90% of a measurement period. It is the value often used to describe background noise.
L_{Amax}	The maximum (A-weighted) sound level measured during a given time. 'Fast' or 'Slow' meter response should be cited.
L_{AE}	The sound exposure level is a notional noise level and describes the average L _{Aeq} noise level of an event over a given time period as if it occurred during a one second period. This allows the L _{Aeq} to be determined over a time period with a number of distinct events.
Free-field Level	This refers to the sound level measured outside, away from reflecting surfaces.

APPENDIX B – Example Noise Breakout Calculation



Contract No: P4229
Client: Pozzoni
Project: Cheetham Hill Gym

Date: 13-Nov
Consultant: WJK

NOISE BREAK OUT TO OUTSIDE

Noise Source Amplified music (Internal to External)

Corrections to obtain L_p at element ?
(eg distance/directivity)

Building & Element Façade - 0.5mm steel outer sheet / 100m insulation quilt / 0.5mm steel / Kingspan 1000 / 12.5mm wall board

Area (S) 80 m² Width(a)= 25 m Height(b)= 3 m

Position Directivity (Q) 4 (=4 for a wall, 2 for a roof)
Additional Directivity

Receiver

Distance (R) from element 20 m

Propagation Corrections

Barrier 0
Façade 0

Calculation

Frequency, Hz	63	125	250	500	1k	2k	4k	8k	dBA
Internal Level, dB	54	56	44	42	27	20	16	-18	44
Internal Corrections, dB									
Corrected Internal Level, Lin, dB	54	56	44	42	27	20	16	-18	44
SRI of Element, dB	12	13	27	46	74	87	94		
Additional Directivity, dB									
Propagation Corrections									
Barrier, dB									
Façade, dB									
Level (2) at Receiver, dB	22	23	-3	-24	-67	-87	-98	-38	7
Criterion, dB	44	40	38	35	37	32	22		40