



CERT PROPERTY

HILTON HOUSE, HILTON STREET, MANCHESTER

NOISE ASSESSMENT FOR PLANNING PURPOSES

23 February 2021

AEC REPORT: P4291/R1/MR

Acoustic & Engineering Consultants Limited

Lockside 1 Stockport Road Marple Stockport Cheshire SK6 6BD
Telephone 0161 449 5900 mail@aec ltd.co.uk www.aec ltd.co.uk

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Prepared by  M F Ridley BMus (Hons) AMIOA(D)

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1.0 INTRODUCTION

- 1.1 Acoustic & Engineering Consultants Limited (AEC) has been instructed by CERT Property to assess the impact of noise emitted from the proposed restaurant on the ground floor of Hilton House, Hilton Street, Manchester. The venue will open onto Port Street, Manchester.
- 1.2 The report presents an assessment of the proposals and considers the following elements:
- Music and patron noise break-out to external from the restaurant,
 - Music and patron noise break-out to the connected Feel Good Club,
 - Plant noise break-out.
- 1.3 It should be noted that AEC's noise measurements were undertaken during the Governments lockdown due to the Covid-19 pandemic. During the lockdown all entertainment venues were closed. Therefore, the amount of road traffic and pedestrians in the areas was significantly reduced and building services plant associated with the entertainment venues were not operating.
- 1.4 Acoustic terminology is discussed in brief in Appendix A.

2.0 BACKGROUND AND SITE DESCRIPTION

Background

- 2.1 The proposed restaurant will be located on the ground floor of Hilton House, Hilton Street, Manchester, as identified on the attached Figure 1.
- 2.2 Hilton House is located on the corner of Tariff Street, to the south, Hilton Street, to the east, and Port Street, to the north.
- 2.3 There are a number of entertainment venues on Tariff Street, including The Whiskey Jar and the El Capo bar and restaurant. Their typical operating hours are presented below:
- Whiskey Jar: 1200 to 0000h Monday to Sunday.
 - El Capo bar and restaurant: 1600 to 0000h Monday to Wednesday,
1600 to 0100h Thursday,
1200 to 0230h Friday and Saturday,
1200 to 0000h on Sunday.
- 2.4 There are no entertainment venues operating on the section of Port Street between Hilton Street and Dale Street.
- 2.5 Currently the ground floor of Hilton House is a single restaurant, with external seating, which received planning permission in February 2019. The restaurant has permission to operate between 0700 to 0000h Monday to Sunday with the external seating closing at 2300h Monday to Sunday.

- 2.6 Planning permission for the single restaurant was based on achieving noise level limits presented in Peak Acoustics Noise Impact Assessment (2106191NR). Noise level limits presented in the Peak Acoustic report, have been deemed to be appropriate for this scheme.

Proposed Restaurant

- 2.7 The proposed scheme includes the dividing of the existing restaurant into two separate units. The existing Feel Good Club café, will continue to operate out of Demise 1, and the proposed restaurant will be located in the second unit described as 'Demise 2' in the attached Figure 2. The entrance to the proposed restaurant will be on Port Street.
- 2.8 AEC understands that the restaurant will play amplified music through speakers for background purposes only. The venue will not play loud amplified or live music.
- 2.9 The nearest residential properties are the Vaults Apartments and Hatters Hostel. The Vault Apartments have elevations on Port Street, Tariff Street and one overlooking an external courtyard separating it from the proposed site. The courtyard was previously used as a ramp to a former basement carpark. Hatters Hostel is on the opposite the side of Port Street to the proposed restaurant.
- 2.10 The ground floor of the Vaults Apartments also shares a separating wall with the proposed restaurant. Previously there was an office between the restaurant and the ground floor of the Vaults Apartments. This office is being retained as either an office or storeroom. In addition, it is understood that the ceiling of the restaurant is not being affected, therefore, noise transfer between the proposed restaurant and the Vault Apartments and the offices above has not been discussed further.
- 2.11 As part of the proposed restaurant there will be new external mechanical services plant at the rear of the property on Tariff Street and a new air conditioning unit that will exhaust to the courtyard separating the proposed restaurant and the Vaults apartments.
- 2.12 Following discussions with the Client it is understood that the number of seats in the external seating area will not be increased. Therefore, noise from this source has not been discussed further.

3.0 NOISE LEVELS

- 3.1 AEC attended site on Sunday 24 January 2021 and measured noise levels between approximately 2300 and 0030h. Measurements were undertaken at a single location on Tariff Street, identified as A on the attached Figure 1.
- 3.2 This location on Tariff Street was external to the ground floor windows of the Vaults Apartments as these are the nearest noise sensitive properties to the proposed mechanical services plant.
- 3.3 All measurements were undertaken in general accordance with BS7445-1: 2003 '*Description and measurement of environmental noise. Guide to quantities and procedures*'. Comment whether it was free-field or a façade level.
- 3.4 A full measurement procedure is presented in Appendix B and a summary of the measured noise data is presented in Table B1. In summary the background noise level at Location A was constantly around 42dB_{LA90,15min} due to mechanical services plant noise associated with the Feel Good Club.
- 3.5 Noise levels were previously measured by Peak Acoustics on Port Street, Location P on Figure 1, in October 2018. Based on the noise levels presented in the Peak Acoustic report, the typical background noise level on Port Street between 2300 and 0000h was 55dB_{LA90,15min}.
- 3.6 This is significantly above AEC's measured background noise level of 42dB_{LA90,15min} and can be considered more representative of the noise climate outside of the government lockdown.
- 3.7 Noise Levels were also previously measured in 2010 by Spectrum Acoustics, in the courtyard between the proposed restaurant and the Vault Apartments, Location S on Figure 1. The lowest night-time background noise level at this location was 41dB_{LA90,T} (2300 to 0700h).
- 3.8 As stated above, AEC's measurements were undertaken during the Government enforced lockdown and all entertainment venues were closed. Due to the proximity of the other entertainment venues on Tariff Street, it is anticipated that background noise levels at Location A would be at least 5dB higher during the night-time period when the restaurant would be operating.

4.0 BASIS OF ASSESSMENT

Local Authority Requirements

- 4.1 Manchester City Council (MCC) has produced '*Planning & Noise – Technical Guidance*' (2015) (PNTG) in relation to their requirements for noise assessments to accompany planning applications.
- 4.2 Based on the proposed development, internal noise breakout (mainly due to amplified music) and noise from mechanical plant will need to be considered.

Internal Noise Breakout

To Feel Good Club via the Separating Wall

- 4.3 Upon discussions with Laura Miller of MCC, it was determined that an assessment of the separating wall between the proposed restaurant and the Feel Good Club is required in order to prevent future noise transfer between the two venues affecting their operations.
- 4.4 It is proposed that maximum noise from the proposed restaurant is controlled to not exceed the existing background noise level in the Feel Good Club.

To External

- 4.5 In relation to internal noise breakout and amplified music, the PNTG states that for a new entertainment venue structurally detached from residential properties in a different building, music noise should be controlled such that:
 - 1. '*Music noise levels in the 63Hz and 125Hz octave centre frequency bands (L_{eq}) should be controlled so as not to exceed (in habitable rooms) 47dB and 41dB (L_{eq}), respectively*'.
 - 2. '*Entertainment noise (LA_{eq}) should be controlled to 10dB below the background noise level (LA_{90}) without the entertainment noise present, in each octave band at the nearest noise sensitive location*'.

Atmospheric Plant Noise Emissions

- 4.6 PNTG, states the following in relation to setting noise level limits for industrial sources, such as external services plant, at noise sensitive premises:

“Externally mounted ancillary plant, equipment and servicing shall be selected and/or acoustically treated in accordance with a scheme designed so as to achieve a rating level of 5dB (L_{Aeq}) below the typical background (L_{A90}) level at the nearest noise sensitive location.”

5.0 NOISE ASSESSMENT

- 5.1 There are three aspects of noise from the site which need to be addressed, noise transfer into the Feel Good Club; noise break-out to the nearest noise sensitive receptor and noise from building services plant. Noise from these sources is assessed separately below.

Noise Transfer to Feel Good Club

- 5.2 There is an existing separating wall between the proposed restaurant and the Feel Good Club. It is understood that the wall is constructed from, 1 layer of 15mm Gypsum Fire Line Plasterboard either side of a 70mm metal stud, sealed with fire mastic to all junctions and finished with a plaster skim.
- 5.3 A sound insulation test was undertaken on the separating wall between the proposed restaurant and the Feel Good Club on Tuesday 2 February. The measured sound insulation performance of the wall was 35dB_{Dw}. It was noted that the main acoustic weakness was the wall itself. It was also noted that noise was flanking via a steel beam which runs continuously between the two venues.
- 5.4 The background noise level in the Feel Good Club, with background music playing and the coffee machines operating was 58dB_{LA90,5mins}.
- 5.5 As stated above, it is understood that the restaurant will play background amplified music. Based on AEC's experience of the noise levels in restaurants with background music, it is expected that the highest typical maximum noise levels in the venue during a busy Friday/Saturday night would be up to around 93dB_{LAmax,F}.
- 5.6 The maximum noise level in the Feel Good Club due to the proposed restaurant has been calculated based on the assumed maximum noise level, and the sound insulation performance of the separating wall. The calculated maximum noise level is presented in Table 5.1. The background noise level in the Feel Goof Club, the proposed noise design aim, and the difference between the two is also presented in Table 5.1.

**Table 5.1 – Calculated Maximum Noise Level in the Feel Good Club
and Comparison with the Design Aim**

Comment	Noise Level, dB							
	Overall	Octave Band Centre Frequencies, Hz						
		63	125	250	500	1k	2k	4k
Assumed Maximum Noise Level in Restaurant, $L_{Amax,F}$	93	79	80	85	90	90	85	80
Sound Insulation of Wall, D_w	35	19	24	35	36	36	37	38
Noise Level in Feel Good Club	-	60	56	50	54	54	48	42
Background Noise Level in Feel Good Club, $L_{A90,T}$	58	51	59	57	57	53	47	42
Difference	-	+9	-3	-7	-3	+1	+1	0

- 5.7 Table 5.1 shows that the proposed design aim would not be achieved in the 63Hz, 1kHz and 2kHz octave band centre frequencies. Therefore, mitigation measures are required.
- 5.8 In order to improve the sound insulation performance of the wall, it is proposed that an independent lining consisting of two layers of 15mm thick SoundBloc plasterboard is installed. The frame supporting the lining must be completely independent of the existing wall, and the back of the inner layer of plasterboard should be at least 150mm from the existing wall. The cavity formed should be partially filled with 100mm thick mineral wool acoustic insulation or equivalent.
- 5.9 Once the sound insulation performance of the wall has been improved, other noise flanking paths may be more clearly identifiable. Therefore, it is recommended that a sound insulation test is undertaken on the wall once the lining has been installed.

Noise Break-Out to the Nearest Noise Sensitive Receptor

- 5.10 The external envelope of the building is mainly curtain walling consisting of single pane glazing. Based on the assumption the glazed areas consist of 4-6mm glass, a sound insulation performance of around 29dB R_w has been used in this assessment.
- 5.11 The doors to the development appear to be double glazed panes of glass with an expected sound insulation performance of around 29dB R_w .
- 5.12 During AEC's site visit it was noted that there are ventilation louvres above the door and the glazing. It has been assumed that these louvres are open and would only have a negligible sound insulation performance.
- 5.13 As the walls of the external envelope are expected to have a sound insulation performance at least 10dB greater than the glazing or doors, they will not influence the assessment and have been excluded.
- 5.14 In order to calculate the noise breakout of the development onto Port Street, AEC will use the information presented in Table 5.2, below.

Table 5.2 – Elements of the External Envelope

Elevation	Element	Areas, m ²	Sound Insulation Performance, dBR _w
Port Street	Glazing	(2m x 2.5m) 5	29
	Door	(2m x 2.5m) 5	29
	Vents	(4m x 0.5m) 2	-

- 5.15 Based on AEC's previously measured noise levels in a busy city centre restaurant on a Friday/Saturday night ambient noise levels within the venue would be expected to be around 83dB_{L_{Aeq,1h}}. This level has been used in the calculation to determine the noise level breaking out of the restaurant presented in Table 5.3.
- 5.16 As stated above, the background noise level measured by AEC are not deemed representative of the typical noise climate when entertainment venues are fully operation. Therefore, the background noise level limits presented in the Peak Acoustic report has been used in this assessment. The octave band spectrum presented in Table 5.3 is based on the spectrum measured by Peak Acoustic and presented in their report.
- 5.17 Based on the sound insulation performances presented in Table 5.2, and distance attenuation to the nearest noise sensitive receptor (13m), AEC has calculated with the ambient noise level external to the Hatters Hostel as the external windows of the Vaults Apartments are screened from the façade of the proposed restaurant. The resultant ambient noise level is presented in Table 5.3.

Table 5.3 – Allowable Internal Noise Level Limit

Element Noise Level	Overall, dB(A)	Noise Level, dB @Octave Band Centre Frequencies, Hz						
		63	125	250	500	1k	2k	4k
Assumed Maximum Noise Level in Restaurant, $L_{Amax,F}$	83	70	70	75	80	80	75	70
Calculated @13m	32	28	24	33	33	23	15	13
Noise Level Limit	45	51	46	41	40	41	37	30
Difference	-	-23	-22	-8	-7	-18	-22	-17

- 5.18 Table 5.3 shows that MCC's requirement that entertainment noise is controlled to not exceed 10dB below the existing background noise level in each octave band has not been achieved.
- 5.19 However, MCC's requirement relates to entertainment noise, and as the main noise source associated with the development would be patrons talking, as opposed to amplified music, MCC may accept meeting the existing background noise level as this would only marginally be exceeded in two octave bands.
- 5.20 If mitigation measures are required, the louvres should be replaced with a solid panel with a sound insulation performance of at least 20dBR_w, such as 2 layers of British Gypsum SoundBloc.

Mechanical Services Plant

- 5.21 AEC are not currently aware of the specific items of plant that will be installed at the development. However, it is understood that currently the plans are to install an air handling unit (AHU) which would exhaust into the rear courtyard, and kitchen extract plant exhausting onto Tariff Street.
- 5.22 As a full assessment cannot be undertaken at this stage, a noise level limit to be achieved at the nearest noise sensitive receptor has been proposed for each item of plant and these are discussed separately below.
- 5.23 Based on the measured noise levels by Spectrum Acoustics, the background noise level in the Courtyard is $41\text{dBL}_{\text{A90,8hours}}$. Therefore the achieve a specific noise level 5dB below the lowest background noise level of $41\text{dBL}_{\text{A90,8hours}}$, the noise level limit in the courtyard is $36\text{dBL}_{\text{A90,8hours}}$.
- 5.24 In relation to Tariff Street, as stated above AEC's background noise level were conducted during the UK's national lockdown. As such many of the usual noise sources on Tariff Street were not active such as the Whiskey Jar bar and the El Capo restaurant/bar. Therefore, due to AEC's experience of city centre roads, it can be said that the measured background noise levels are significantly lower than what would be expected from a busy city centre road.
- 5.25 Due to this, AEC has used the previously measured background noise levels by Peak Acoustics which is $55\text{dBL}_{\text{A90,15minr}}$ (2300-0000h) to base the assessment on. To set the noise level limit of $50\text{dBL}_{\text{Ar,Tr}}$ on Tariff Street.

Air Handling Unit

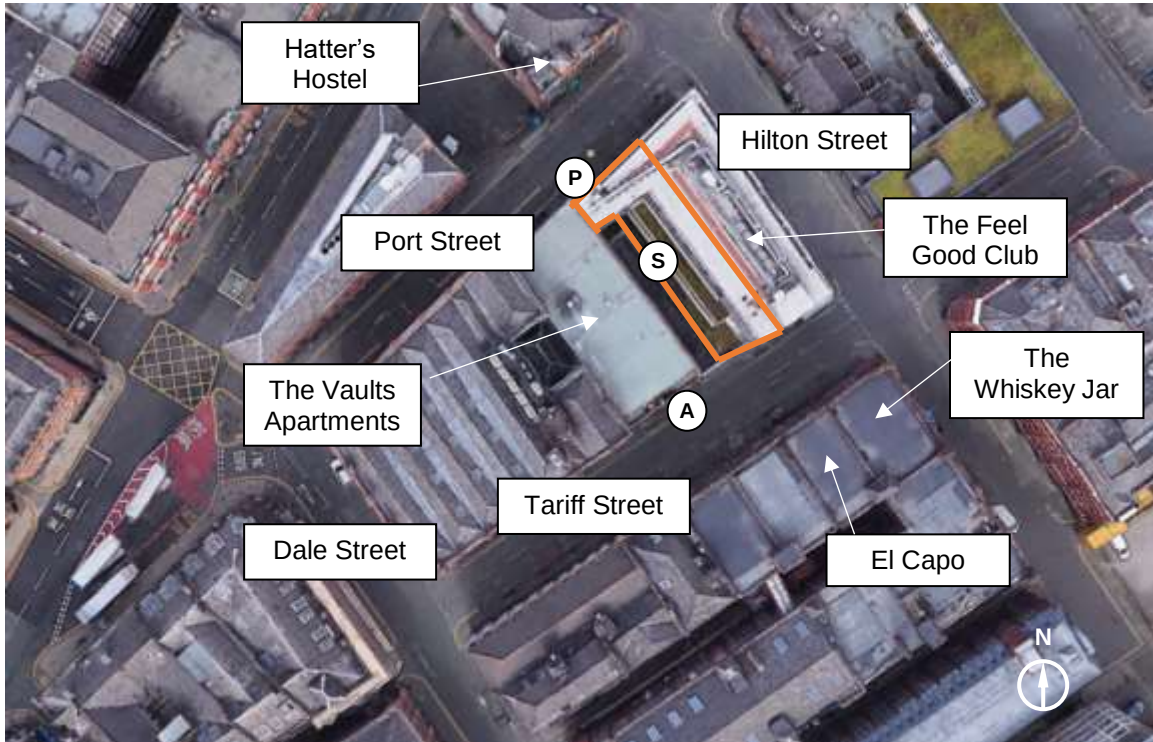
- 5.26 The proposed AHU is to be installed in the proposed office/storeroom in the restaurant and will discharge through the existing louvre overlooking the rear courtyard.
- 5.27 Based on satellite imagery, the nearest residential window to this location is approximately 2.5m from the location of the air conditioning extract. To control noise from this source to meet the noise level in the Courtyard, presented above would be very onerous to achieve.
- 5.28 Mitigation could be achieved in the form of attenuated louvres or an acoustic enclosure. Alternatively, this would be relocated to exhaust onto Tariff Street which may be an easier option.
- 5.29 If the AHU could be related onto Tariff Street, to meet the noise level limit presented above, noise from the AHU should be controlled to no greater than $65\text{dBL}_{\text{Aeq,T}}$ at 1m . With no tonal or impulsive characters to the sound.

Kitchen Extract Plant

- 5.30 The nearest noise sensitive property to the rear of the proposed restaurant is the Vaults Apartments that are approximately 8m away.

- 5.31 To meet the noise level limit presented above, noise from the kitchen extract plant should be controlled to no greater than $65\text{dB}_{\text{LAeq,T}}$ at 1m . With no tonal or impulsive characters to the sound.
- 5.32 If a mechanical services plant unit cannot be selected with the output as described above, mitigation could be achieved in the form of silencers/attenuators or an acoustic enclosure. This can be considered at a detailed design stage.

FIGURE 1 – Existing Site Showing Monitoring Locations



Map data @2021 Google United Kingdom

FIGURE 2 – Current Floor Plan

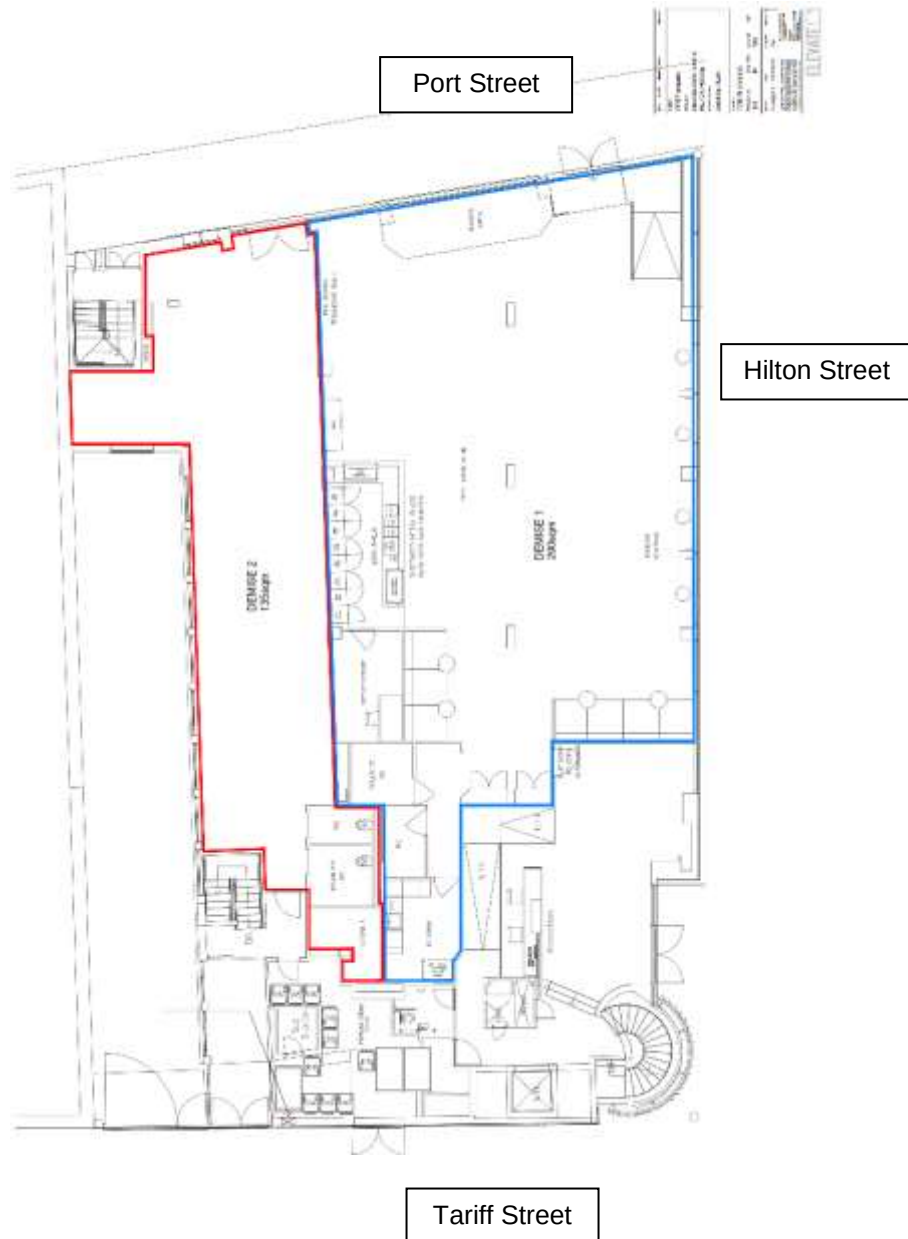


Figure 3 – Previous Floor Plan

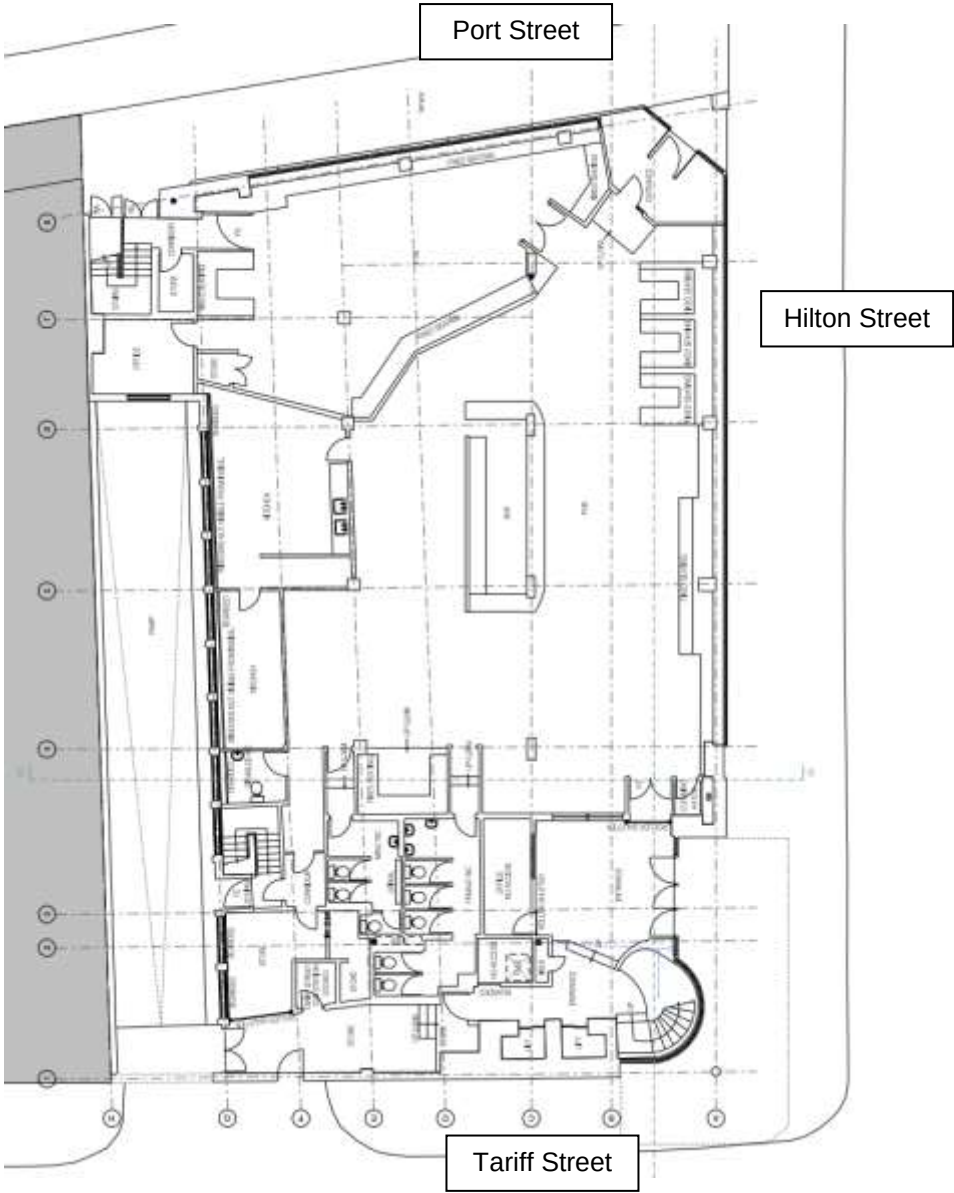


Figure 4 – Port Street Façade



APPENDIX A – Acoustic Terminology in Brief

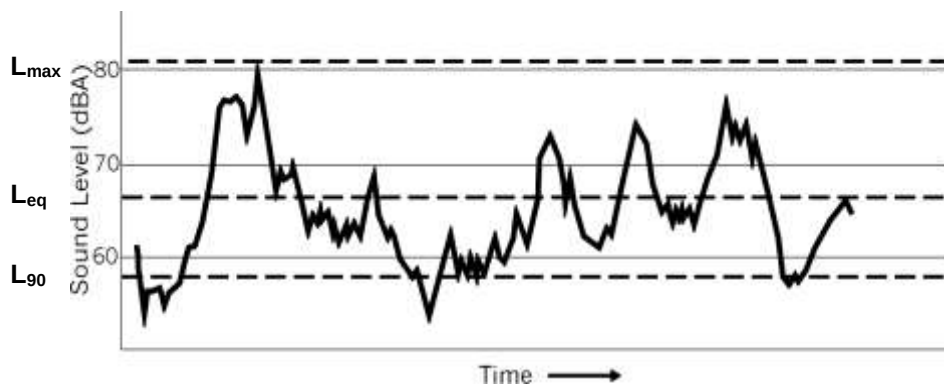
Sound is produced by mechanical vibration of a surface, which sets up rapid pressure fluctuations in the surrounding air. The rate at which the pressure fluctuations occur determines the pitch or *frequency* of the sound. The frequency is expressed in Hertz (*Hz*), that is, cycles per second. The human 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 $dB L_{Aeq,T}$



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, <i>T</i> . 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_{A1}	The (A-weighted) sound level exceeded for 1% of a measurement period. It is the value generally used to indicate a 'typical' maximum 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}	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.
Free-field Level	This refers to the sound level measured outside, away from reflecting surfaces.
Façade Level	This refers to the sound level measured outside, at 1m from a hard reflecting surface, typically 3dB greater than the free-field level.

APPENDIX B – Noise Survey Details

Date & Time of Survey:	Sunday 24 January 2021, 2330 to 0030h					
Personnel:	Michael Ridley (AEC).					
Equipment Used:	Cirrus CR:171B Real Time Analyser (AEC Kit 3)					
Calibration:	The sound level analysers, which conforms to BS EN 61672-1: 2003 ' <i>Electro acoustics – sound level meters - Part 1 Specifications</i> ' for Class 1 Type Z meters, was in calibration and check calibrated before and after the measurement periods using a Brüel & Kjær type 4231 (94dB) calibrator. There was no significant drift of calibration. Calibration certificates are available on request.					
Weather Conditions:	Date	Period	Wet/Dry	Temp°C	Wind Speed & Direction	Cloud Cover
	24 January 2021	Night	Dry	-4°C	Negligible	10%
Measurement Locations:	Attended: Measurements were undertaken at 1 location around the development site. Identified as A on Figure 1 and described below. A – 2m from Tariff Street's nearest carriageway					
Measurement Details:	Attended: Measurements were undertaken over various periods in terms of L_{eq} , L_{10} , L_{90} , and L_{max} .					
Façade / Free-Field:	Attended: A – façade.					
	Full results for the attended measurements are given in Table B1.					
Measured Data:	Full 1/3 rd octave band centre frequency data was obtained for all measurements.					

TABLE B1 – Measured Daytime Noise Levels

Location	Period, h	Noise Level, dB				Comments
		L_{Aeq}	L_{A10}	L_{A90}	$L_{Amax, F}$	
A	2333 – 2345	53.4	51.0	42.3	73.4	The main source of background noise was the existing plant at the rear of Feel Good Club.
	2345 – 0000	45.6	46.3	42.2	63.9	
	0000 – 0015	50.9	48.7	42.5	74.5	
	0015 – 0030	44.3	45.4	42.1	59.8	