



PROJECT TECHNICAL MEMORANDUM

JOB TITLE : Slate Wharf
REF : HT: 28795/PTM1
DATE : 4 June 2021
FROM : George Grenfell
ISSUED TO : Tom Flanagan

Hann Tucker Associates

Consultants in Acoustics Noise & Vibration
Duke House 1-2 Duke Street Woking Surrey GU21 5BA
(t) +44 (0) 1483 770595
(e) enquiries@hanntucker.co.uk
(w) hanntucker.co.uk

Directors:
Stuart G Morgan CEng MIMechE MCIBSE FIOA (Chairman)
Simon R Hancock BEng(Hons) CEng MCIBSE FIOA (Managing)
John L Gibbs MIOA(D) MSEE CEnv
John R Ridpath BSc(Hons) MIOA
Andrew D Fermer BSc(Hons) MIOA
Andrew G Jameson BSc(Hons) MIOA
Lorraine M. Gregory (Company Secretary)

RE: SLATE WHARF, CASTLEFIELD ACOUSTIC CONSULTANCY SERVICES

1.0 Introduction

A new build residential development has been granted planning permission at slate wharf in Castlefield, Manchester. The development comprises one block of 24no. dwellings.

A noise survey and assessment has previously been completed by Royal Haskoning to support the initial planning application (Ref: I&BPB5246R001F01), however this memorandum serves as an updated assessment to consider the latest designs.

2.0 Acoustic Standards and Guidelines

2.1 Local Planning Requirements

Planning permission has been granted subject to conditions. Condition 13 relates to noise mitigation and is the focus of this technical memorandum. The condition is as follows:

13) Before the development commences a scheme for acoustically insulating the residential accommodation against noise from Chester Road, nearby transport networks and any other actual or potential sources of noise that require consideration on or near the site, including any local commercial/industrial premises, shall be submitted to and approved in writing by the City Council as local planning authority. The approved noise insulation scheme shall be completed before any of the dwelling units are first occupied. Noise survey data shall include measurements taken during a rush-hour period and night time to determine the appropriate sound insulation measures necessary. The following noise criteria shall be required to be achieved:

Bedrooms (night time - 23.00 - 07.00)	30 dB LAeq (individual noise events shall not exceed 45 dB L_{Amax,F} by more than 15 times)
Living Rooms (daytime - 07.00 - 23.00)	35 dB LAeq
Gardens and terraces (daytime)	Designed to achieve the lowest practicable levels.

11



b. The approved noise insulation scheme shall be completed and a post-completion verification report (including validation that the work undertaken throughout the development conforms to the recommendations and requirements of the acoustic report approved under part a. above and including the results of post-completion testing to confirm that the internal noise criterion have been met) shall be submitted to and approved in writing by the City Council as local planning authority before first occupation of the development. Any instances of non-conformity with the approved acoustic report shall be detailed within the post-completion report along with any measures required to ensure compliance with internal noise criteria. Those measures shall be implemented in full before any of the dwellings are first occupied.

Reason - To secure a reduction in noise from the main roads and surrounding road networks and any other potential sources of noise, in order to protect future residents from noise nuisance, pursuant to policies SP1, H1 and DM1 of the Core Strategy.

2.2 Guidance Relating to Control of Music / Entertainment Noise

Whilst not strictly covered within the wording of Planning Condition 13, due to the sites proximity to existing and established commercial premises (ie The Wharf) the planning noise report also considered noise impact from commercial premises. The most notable impact from such sources relates to music noise, which can often be prevalent at lower frequencies which if not considered can cause disturbance to future occupants due to the fact low frequency noise is harder to mitigate.

The following sections summarise relevant standards and literature which have informed our assessment of music noise. It is worth noting that our assessment presented herein aligns with the methodology present within the initial planning noise report.

2.2.1 Institute of Acoustics (IoA) Good Practice Guide - Control of Noise from Pubs & Clubs

In 1996, the IoA established a working group to produce guidance and criteria on the control of noise from pubs and clubs. The group was unable to produce a formal Code of Practice due to industry representatives withdrawing. Whilst the initial drafts of the Good Practice Guide proposed objective assessment criteria within an Annex, the IOA decided that the criteria were not sufficiently robust and they were therefore not published within the final document.

The published document suggests that music noise should be considered to be inaudible when:

“it is at a sufficiently low level such that is not recognizable as emanating from the source in question and it does not alter the perception of the ambient noise environment that would prevail in the absence of the source in question”.



For venues with regular “high noise” generating events per year (more than one per week extending beyond 23:00hrs), the guide suggests entertainment noise in terms of $L_{Aeq,15min}$ should not exceed the background L_{A90} noise level, with typical maximum L_{10} music levels not exceeding the L_{90} in any 1/3 octave band between 40 and 160 Hz.

2.2.2 Defra NANR45: Procedure for the Assessment of Low Frequency Noise Complaints

This document aims to recommend an objective method for assessing low frequency noise suitable for use by Environmental Health Officers in the UK.

Criteria already in use in Germany, Sweden, Denmark, Netherlands and Poland were reviewed and compared against the experience from these countries in applying the criteria, which was found to be generally positive.

The above study was supplemented by a set of field and laboratory studies to subsequently inform the proposed criteria (Moorhouse Curve) in 1/3 octave bands between 10 Hz and 160 Hz.

For the assessment of low frequency music noise through external building fabric, it is generally more practical to consider the 63 Hz and 125 Hz octave bands due to the difficulty in obtaining 1/3 octave band sound insulation performance data for various construction materials.

When logarithmically summed, the Moorhouse Curve provides limits at 63 Hz and 125 Hz of 47 dB L_{eq} and 41 dB L_{eq} , respectively, with a relaxation of 5 dB during daytime hours.

The above levels provide a good practical basis to assess low frequency music noise and are now implemented as a criterion for planning applications across many Local Authorities, such as Manchester City Council.

2.2.3 Other Relevant Guidelines

Further guidance on noise control from entertainment venues can be sought from:-

- The Noise Council, Code of Practice on Environmental Noise Control at Concerts;
- Noise Act Research, 163 Noise from Pubs & Clubs;

For each of the above, assessment criteria is proposed based on significant research and, in all cases, the criterion aims to prevent annoyances through minimising or avoiding ‘audibility’ of the noise. In all documentation, reference is made to an assessment of “ L_{eq} ” entertainment noise levels relative to the prevailing background noise level, with consideration for low frequency noise in the 63 Hz and 125 Hz octave bands.



3.0 Project Overview

The proposed development is located on land east of the A635 and falls under the jurisdiction of Manchester City Council (MCC). The site is adjacent to 'The Wharf' bar and south of a dual railway/tram line. The site is bounded by existing and established residential dwellings to the north and west and Bridgewater Canal to the east.

See below figure illustrating site location and surrounding buildings.



Location Plan (Google Maps 2021)

4.0 External Noise Levels

4.1 Overview

Due to COVID-19 restrictions present at the time of writing, it has been agreed with Manchester City Council that the baseline noise survey data collated to support the 2016 planning application (pre-lockdown) will offer representative data for the purpose of this assessment.

The full methodology and results of this survey are presented in a Noise Impact Assessment Report by Royal Haskoning, reference I&BPB5246R001F01, dated 15 July 2016.



In short, attended measurements of environmental and entertainment noise levels were taken on the 11 March and 18 March 2016 at a single measurement position. The noise climate was noted to be made up of road traffic noise from the surrounding road network, pedestrians, patrons and music at The Wharf pub and trains/trams passing by.

The approximate measurement position is indicated on the plan overleaf:



Location Plan indicating the measurement position for Royal Haskoning survey

5.0 Previously Established Baseline Noise Levels

5.1 Attended Survey Results

The results of the environmental noise survey undertaken by Royal Haskoning on 11 March 2016 are as shown in the table below and are presented as free field levels:

Time	Measured Free-field Environmental Noise Level (dB)			
	L _{Aeq,T}	L _{A90}	L _{A10}	L _{Amax}
10:55-13:55	59	53	62	85
21:05-22:35	55	52	58	72



To assess the impact of entertainment noise Royal Haskoning obtained octave band measurements (ie at 63 Hz and 125 Hz) at the closest proposed facade location over the full duration of a live music event at 'The Wharf'. The results are presented in table below as free field noise levels:

Frequency band	Measured $L_{eq,T}$ (dB)
63Hz	71
125Hz	61

5.1.1 Subjective Comments from Royal Haskoning Survey

During the daytime measurement period (10:55 to 13:55) the dominant noise source was noted to be road traffic on the surrounding road network, trams/trains on the nearby railway lines, HGV deliveries and recycling / rubbish collection.

During the evening period (21:05 to 22:35) the dominant noise sources were noted to be largely the same as during the daytime with the addition of patron activity outside the wharf pub. There was a live music event during this period however the music noise was not noted to be dominant.

L_{Amax} levels measured during the evening period (21:05 to 22:35) are thought to be representative of the worst-case night-time max levels across the site, and it is suggested that by using these evening sound pressure levels to inform incident night-time L_{Amax} levels would present a robust assessment.

5.2 Predicted Incident Environmental Noise Levels

It is noted that Royal Haskoning undertook acoustic modelling to predict the environmental noise levels incident upon the various facades of the now consented scheme. These incident noise levels as used to inform our assessment of noise intrusion are presented in the following table, and where necessary these have been corrected from façade to free-field.

Elevation	Predicted Incident Free-field Environmental Noise Level (dB)		
	Daytime 07:00 – 23:00 $L_{Aeq,16hrs}$	Night-time 23:00 to 07:00 $L_{Aeq,8hrs}$	Night-time 23:00 to 07:00 $L_{Amax,15 mins}$
East	64	61	72
West	61	58	72
South	56	53	72



5.3 Predicted Incident Entertainment Noise Levels

To calculate the incident noise levels at the proposed development, Royal Haskoning have modelled The Wharf Pub as having an internal noise level of 94dBA during a live music event and the encompassing façade as 100mm concrete with a weighted sound reduction index of R_w 48. The external beer garden was also modelled as an area source with a sound power level of 66 L_w per m^2 , further detail can be found in their report (ref: 113617_FO_2016—558389). The following incident entertainment noise levels as predicted by Royal Haskoning shall be adopted in our BS 8233 noise intrusion assessment.

The predicted incident noise levels from entertainment noise sources are as shown in the table below. These values have been corrected from façade to free-field.

Façade	Predicted Incident Free-field Entertainment Noise Level (dB)	
	Daytime 07:00 – 23:00 $L_{Aeq,T}$	Night-time 23:00 to 07:00 $L_{Aeq,T}$
East	52	41
West	41	31
South	55	43

To assess the impact of entertainment noise in accordance with the low frequency criteria specified in section 2.2.2, Royal Haskoning obtained octave band measurements at the closest proposed façade location over the course of a live music event at 'The Wharf'. The results are presented in table below as free-field sound pressure levels:

Frequency band	Measured L_{eq} (dB)
63Hz	71
125Hz	61

6.0 Noise Intrusion Assessment

6.1 Overview

This section assesses environmental noise intrusion into residential rooms (living rooms and bedrooms) to determine preliminary acoustic performance specifications for the critical façade elements, namely windows and ventilators.



The latest drawings issued by GA Studio indicate that external walls shall comprise cavity brick/block with punched in conventional thermal doubled windows. The roof will mostly be tiled (pitched) with an insulated roof void and plasterboard ceiling to apartments.

Sound reduction performance values for these elements have been derived empirically using the software package Insul. These values are presented below and have been corrected to account for sound flanking / reasonable site-workmanship.

Element	INSUL Sound Reduction, R (dB) at Octave Band Centre Frequency (Hz)						R _w + C _{tr}
	125	250	500	1k	2k	4k	
External wall	37	40	45	50	55	55	45
Roof	33	42	45	50	50	50	44

Our internal noise level calculations follow BS 8233 procedures. For each façade zone, we have considered the worst case living room and bedroom dimensions and window sizes as per the latest design drawings (at the time of writing). The intent is to ensure internal ambient noise levels do not exceed limits set out in Planning Condition 13.

Background ventilation, to Building Regulations Part F, is assumed to be provided by means of single 2,500 mm² (min) free area trickle ventilators in window heads to each habitable room in conjunction with mechanical extract fans in bathrooms (and kitchen hood).

6.2 Preliminary Guidance for Windows & Ventilators

6.2.1 Environmental Noise Intrusion Assessment

The sound reduction performance requirements may vary across a façade. However, for the sake of simplicity we have segregated facades into zones as shown below. For each zone, we have specified a minimum façade sound reduction performance requirement, these values are to be achieved with windows closed.



Proposed façade zones for controlling environmental noise.

Residential Tower Façade Zone	Minimum Octave Band Sound Reduction Specification for Windows, $R_w + C_{tr}$ (dB)	Minimum Octave Band Specification for Ventilation $D_{ne, w} + C_{tr}$ (dB)
Red	34	40
Orange	31	37
Green	27	33

The above demonstrates that, with appropriately selected double glazed windows achieving the above acoustic specification, the internal noise level criteria presented in Section 2.1 **Error! Reference source not found.** should be achieved.

6.2.2 Entertainment Noise Intrusion Assessment

Due to the prevalence of low frequency noise across the proposed development site during live music events at ‘The Wharf’, the specified façade elements will need to achieve the low frequency sound insulation performance requirements detailed in Section 2.2.2.



Proposed façade zones for controlling entertainment noise.

Residential Tower Façade Zone	Minimum Octave Band Sound Reduction Specification for Windows, $R_w + C_{tr}$ (dB)		Minimum Octave Band Specification for Ventilation $D_{ne, w} + C_{tr}$ (dB)	
	63Hz	125Hz	63Hz	125Hz
Blue	24	19	33	36

The above demonstrates that, with appropriately selected double glazed windows and trickle/in-wall ventilators that achieve the above acoustic specifications, the internal low frequency noise level criteria presented in Section 2.2.2 should be achieved.

Due to the proximity of the development to commercial premises, it is recommended that consideration be given to mechanical ventilation in place of MEV with passive vents as this may reduce the reliance on higher performing glazing, and furthermore mechanical ventilation (MVHR) provides underlying noise masking which in-turn can mitigate the impact of music noise.



7.0 Conclusion

Ultimately, this memo presents guidance to inform selection of critical façade elements to achieve the internal ambient noise level criteria set out in Planning Condition 13.

Based on historical measurements, computer modelling undertaken by Royal Haskoning and the latest drawings provided by GA studio indicating the room dimensions locations, our assessment indicates that environmental and entertainment noise sources may be sufficiently controlled with the appropriate selection of critical façade elements, as specified in Section 6.2.

For and on behalf of
HANN TUCKER ASSOCIATES

George Grenfell

