

SANDY BROWN

Consultants in Acoustics, Noise & Vibration

21557-R01-C

14 December 2021

Former B&Q site, Trafford

Town and Country Planning Act 1990

Appeal by: Accrue (Forum) 1 LLP

Site Address: Former B&Q Site, Great Stone Road, Stretford, M32 0YP

LPA reference: 100400/OUT/20

PINS reference: APP/Q4245/W/20/3258552

Proof of evidence of Dr Matthew Robinson on behalf of the Local Planning Authority regarding the acoustic design of residential apartments

London, Manchester, Edinburgh, Birmingham, Belfast, Leeds

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Consultants in Acoustics, Noise & Vibration

Version	Date	Comments	Author	Reviewer
A	9 Dec 21		Matthew Robinson	Mark Howarth
B	13 Dec 21	Minor changes and added Appendix B	Matthew Robinson	Mark Howarth
C	14 Dec 21	Revised introduction	Matthew Robinson	Mark Howarth

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Summary proof

- 0.1. Sandy Brown Ltd has been appointed by Trafford Council to provide an acoustic review of the proposed residential development at the Former B&Q site on Great Stone Road (Trafford Council planning ref: 100400/OUT/20).
- 0.2. My full name is Matthew Robinson. I hold a Doctor of Philosophy (PhD), a Bachelor of Science (BSc) and I am a Chartered Engineer (CEng). I am a Member of the Institute of Acoustics. Most of my 10-year working career has been focused on noise and vibration control and the acoustic design of buildings.
- 0.3. I am an Associate at the firm of Sandy Brown. Prior to joining Sandy Brown 8 years ago, I carried out research at the University of Liverpool in the field of speech security. Prior to this I achieved my Doctor of Philosophy (PhD) which was focused on the prediction of structure-borne sound in buildings. I have been responsible for the acoustic design on a wide variety of building types including residential developments, hotels, schools, hospitals and specialist facilities with high acoustic performance standards.
- 0.4. The proposed development comprises 333 residential apartments, ground floor commercial units and residential amenity spaces. The development site is located immediately south-west of Lancashire County Cricket Club (Old Trafford), bounded by Great Stone Road and the Altrincham spur of the Metrolink tram line. The nearest track of the Metrolink line is approximately 28 m away from the nearest facade of the proposed development.
- 0.5. In addition to cricket matches, Lancashire County Cricket Club (LCCC) host live music concerts. Historically, live music concerts have been held 1-2 times a year, though the club has a license to hold up to seven concerts a year.
- 0.6. Acoustic input supporting the planning application has been provided by Holtz Acoustics.
- 0.7. A planning appeal of the proposed development has been received by Trafford Council, and comments on the acoustic design of the proposed development have been provided by Vanguardia (on behalf of LCCC).
- 0.8. The proposed internal noise criteria in the Holtz Acoustics documents are based on BS 8233:2014 and have been proposed for environmental noise sources and sporting events. However, no internal noise criteria have been set for noise ingress from music noise from concerts.
- 0.9. A noise survey during a live music concert has been carried out by Holtz Acoustics. The measurement positions used were either mainly screened from the main loudspeaker arrays and crowd by the LCCC shop building (located between the stands and the development site), or significantly further away from the loudspeaker arrays compared to the worst-case facade location. As such there would be significant uncertainty in using these data as input for an environmental noise model. They should not be used as sole data for assessing facade noise levels at the proposed development.

- 0.10. The Holtz Acoustics predicted facade noise levels from a live music concert event differ significantly from Vanguardia's predictions based on the same event. I have provided comparisons and technical reasons for the differences. I consider that Vanguardia's assessment approach to be appropriate, and the measured and predicted noise levels shown in Vanguardia's assessment representative of a live music concert at LCCC.
- 0.11. Vanguardia's concert noise survey data/noise modelling data should be used to inform the facade sound insulation assessment during live music concerts for the proposed development.
- 0.12. Holtz Acoustics have modelled the music noise levels from a concert at LCCC using their own survey data. However, an assessment of the facade sound insulation performance to achieve suitable internal noise levels in the proposed development has not been carried out.
- 0.13. Based on the worst-case predicted music noise levels at the proposed facade from Holtz (L_{Aeq} 78 dB) and the facade sound insulation proposed by Holtz the expected internal noise levels would be approximately L_{Aeq} 41 dB. This is an estimate as octave-band music noise levels at the proposed facade are not provided.
- 0.14. Based on the worst-case predicted music noise levels at the proposed facade from Vanguardia (L_{Aeq} 90 dB) and the facade sound insulation proposed by Holtz the expected internal noise levels would be approximately L_{Aeq} 53 dB. This is an estimate as octave-band music noise levels at the proposed facade are not provided.
- 0.15. Both these predictions result in internal noise levels in the proposed development that are unacceptable and would likely cause disturbance to occupants.
- 0.16. It is appropriate that the design of the proposed residential development is carried out so that internal noise level criteria in line with BS 8233: 2014 are achieved at all times, including during all events at LCCC. This to protect future residential amenity while still allowing LCCC to operate as they do currently, in line with the Agent of Change principle. This would not mean noise from events, particularly music concerts, would be inaudible in the apartments. I consider this a reasonable compromise but there would still therefore be potential for complaints during noisy events.
- 0.17. To achieve the BS 8233: 2014 daytime internal noise criteria, based on the worst-case predicted music noise levels at the proposed facade from Vanguardia (L_{Aeq} 90 dB), the required overall facade sound insulation performance would be approximately R'_w+C_{tr} 48-50 dB. This performance cannot be achieved by standard commercially available double glazing.

0.18. There are other issues which need to be considered which have not yet been addressed in the acoustic design:

- How additional ventilative cooling is provided during periods of summertime overheating while maintaining acceptable internal noise levels
- The potential adverse effect of ground-borne re-radiated noise from the nearby Metrolink tram link.

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1 Introduction

- 1.1. Sandy Brown Ltd (Sandy Brown) been appointed by Trafford Council to provide an acoustic review of the proposed residential development at the Former B&Q site on Great Stone Road (Trafford Council planning ref: 100400/OUT/20).
- 1.2. The proposed development comprises 333 residential apartments, ground floor commercial units and residential amenity spaces and is located immediately south-west of Lancashire County Cricket Club (Old Trafford).
- 1.3. This report provides a review of the noise survey data, assessments, and acoustic design for the proposed development from Holtz Acoustics, and a review of the objection documentation from Vanguardia.
- 1.4. WSP and Holtz Acoustics, working on behalf of the appellant, were asked to draft a statement of common ground (SoCG) by Monday 13 December 2021. At the time of writing this document a draft SoCG has not been provided for comment.

2 Qualifications

- 2.1. Details of the qualifications of the technical staff that have been involved with the production of this report are set out in Table 1.

Table 1 Staff qualifications and experience

Name	Role	Qualifications
Matthew Robinson (Author)	Associate	PhD, BSc, CEng, MIOA
Mark Howarth (Reviewer)	Director	PhD, BEng, MIOA

- 2.2. Sandy Brown Ltd is a member of the Association of Noise Consultants, and is registered to conduct sound insulation tests under their registration scheme. All members of technical staff have membership of the Institute of Acoustics at the relevant grade.

3 Schedule of literature

- 3.1. Details of the literature and other material which has been relied on in making the report are set out below:
 - Ministry of Housing, Communities & Local Government, *National Planning Policy Framework* (NPPF), July 2021 (specifically paragraph 187)
 - Department for Levelling Up, Housing and Communities and Ministry of Housing, Communities & Local Government, *Planning Practice Guidance* (PPG), July 2021 (specifically paragraph: 009 Reference ID: 30-009-20190722)

- BS 6472-1: 2008 *Guide to evaluation of human exposure to vibration in buildings: Part 1 Vibration sources other than blasting*
 - BS 8233: 2014 *Guidance on sound insulation and noise reduction for buildings*
 - ProPG: *Planning & Noise* 2017
 - Association of Noise Consultants (ANC) guidelines *Measurement and assessment of ground-borne noise and vibration*, 3rd edition, 2020
 - Association of Noise Consultants (ANC) *Acoustics Ventilation and Overheating, residential Design Guide*, v1.1, January 2020
 - Approved Document F to the Building Regulations 2010, incorporating 2010 and 2013 amendments
 - O’Connell East Architects *Design and Access Statement*, issued February 2020
 - O’Connell East Architects architectural layouts, issued February 2020
 - Holtz Acoustics *Great Stone Road, Acoustic Design Statement, Vibration Assessment and Plant Noise Limits Report*, doc ref HA2020023, issued 12 February 2020
 - Vanguardia *Review of noise issues, Lancashire Cricket B&Q site*, doc ref: VC-103597-EA-RP-001, issued 9 August 2021
 - Holtz Acoustics *Site at Former B&Q, Great Stone Road, Trafford, Inquiry evidence, Noise – Summary/Main proof/Appendices*, doc ref HA2020023/A/REV1, issued 5 November 2021
 - Richard Pollitt, Trafford Council email correspondence (to Debra Harrison), sent 15 November 2021 – see Appendix B
 - Vanguardia *Noise from concerts at LCCG*, doc ref: 05636-0820-0-PN-0001, issued 30 November 2021
 - Trafford Council, Agenda papers for Planning and Development Management Committee, agenda item 7, issued 9 December 2021
 - Richard Pollitt, Trafford Council email correspondence (to Matthew Robinson), sent 10 December 2021 – see Appendix C.
- 3.2. I agree with the summary of the Sandy Brown Ltd comments as set out in Trafford Council, Agenda papers for Planning and Development Management Committee, agenda item 7.

4 Site description

- 4.1. The development site (highlighted in red in Figure 1) is located immediately south-west of Lancashire County Cricket Club (Old Trafford), bounded by Great Stone Road and the Altrincham spur of the Metrolink tram line. The nearest track of the Metrolink line is approximately 28 m away from the nearest facade of the proposed development.



Figure 1 Site map (courtesy of Google Earth Pro)

5 Summary of literature

BS 8233:2014

- 5.1. Guidance on acceptable internal noise levels in residential dwellings due to external noise sources is given in BS 8233: 2014.
- 5.2. These internal levels are based on annual average data and do not have to be achieved in all circumstances, such as fireworks night or New Year's Eve (ie, recurring annual events that are experienced by everyone).
- 5.3. The standard states that where development is considered necessary or desirable, the internal target levels may be relaxed by up to 5 dB and reasonable internal conditions still achieved.

Table 2 BS 8233 internal noise criteria for sleeping/resting

Internal space	Indoor ambient noise level, L_{Aeq} (dB)	
	Daytime (07:00-23:00)	Night-time (23:00-07:00)
Living rooms	35	-
Dining room	40	-
Bedrooms	35	30 ^[1]

^[1] BS 8233 notes that individual noise events can cause sleep disturbance, and that a guideline value may be set depending on the character and number of events per night, although no specific limit is provided.

ProPG: Planning & Noise

- 5.4. Internal noise ingress criteria in ProPG are the same as in BS 8233: 2014 but additional guidance is provided in relation to regular individual noise events:

'In most circumstances in noise sensitive rooms at night (e.g. bedrooms) good acoustic design can be used so that individual noise events do not normally exceed 45dB $L_{Amax,F}$ more than 10 times a night. However, where it is not reasonably practicable to achieve this guideline then the judgement of acceptability will depend not only on the maximum noise levels but also on factors such as the source, number, distribution, predictability and regularity of noise events.'

Acoustics Ventilation and Overheating, Residential Design Guide

- 5.5. Guidance on external noise levels from transport noise sources and the assessment of risk in an overheating condition is given in the Association of Noise Consultants *Acoustics Ventilation and Overheating, Residential Design Guide (AVOG)*. A Level 1 assessment comprises assessing the external free-field noise levels to guideline thresholds. If a Level 1 assessment finds that the development falls into a 'Medium' or 'High' risk category a Level 2 assessment should be carried out, assessing the expected internal noise levels for an overheating condition and the associated risk of adverse effect.

Measurement and assessment of ground-borne noise and vibration

- 5.6. Guidance on the measurement and assessment methodology of ground-borne noise and vibration in relation to the effect on buildings and their occupants is given in Association of Noise Consultants (ANC) guidelines *Measurement and assessment of ground-borne noise and vibration*. This document also provides discussion on the relevant research that has been carried out, and a summary of typically adopted criteria.

BS 6472-1: 2008

- 5.7. Guidance on acceptable internal vibration levels in residential dwellings due to vibration sources is given in BS 6472-1: 2008.

6 Comments on proposed acoustic criteria

- 6.1. The proposed internal noise criteria in the Holtz Acoustics documents are based on BS 8233:2014 and are generally suitable. These internal noise criteria have been used to assess the required facade sound insulation due to the noise ingress from transport noise sources and sporting event noise sources, but not music noise from concerts. Given the proximity of nearby significant music noise sources, appropriate internal noise criteria for music noise from concerts should have been set out.
- 6.2. In addition to average noise criteria, consideration from maximum noise levels from single events is also needed. A suitable maximum noise level criterion of L_{AFmax} 45 dB specifically for bedrooms during the night-time (23:00-07:00) has been set in line with ProPG: *Planning & Noise* 2017.
- 6.3. Consideration also needs to be given to vibration and noise from the nearby Metrolink tram link. In relation vibration, tactile vibration criteria due to ground-borne vibration from trams are considered in the Holtz Acoustics documents and criteria are based on BS 6472-1:2008, which are suitable. However, suitable internal noise criteria for ground-borne re-radiated noise from trams have not been proposed.
- 6.4. The internal noise criteria set out in BS 8233: 2014 consider a 'whole dwelling ventilation' condition (as defined in Approved Document F to the Building Regulations 2010, incorporating 2010 and 2013 amendments). During periods of overheating additional ventilative cooling would typically be needed control temperature. Suitable internal noise criteria or guidance has not been set out for when additional ventilative cooling is required during periods of overheating. Appropriate guidance should have been provided for internal noise levels during periods of overheating in line with Association of Noise Consultants (ANC) *Acoustics Ventilation and Overheating, residential Design Guide* (2020).

7 Comments on external noise levels

Transport noise sources

- 7.1. An unattended noise survey was carried out by Holtz Acoustics in November 2017. This identified the key transport noise sources as road traffic on Great Stone Road and trams on the Metrolink line to the south-east of the development site. At the time of issuing the original report the environmental noise survey data was conducted two years prior, and is now over four years prior. Given this situation it is usual to provide a statement reviewing any potential changes to noise sources in the vicinity of the development site.
- 7.2. Average 16-hour daytime (07:00-23:00) and 8-hour night-time (23:00-07:00) noise levels (L_{Aeq}) are presented. However, maximum noise levels (L_{AFmax}) not normally exceeded during the night-time are not thoroughly presented (only a single typical level is provided). I recommend that the maximum noise level not normally exceeded 10 times during a night-time period is clearly identified for each elevation.

Sporting event noise sources

- 7.3. A single attended noise survey has been carried out of a one-day county cricket match by Holtz Acoustics in June 2018 at one measurement position. I have reviewed the noise survey results and the information presented by Vanguardia. I do not consider the noise survey results presented by Holtz Acoustics to be representative of all types of cricket matches, which vary in noise level (eg, international test matches, international one-day/T20 matches, first class county matches, county 20/20 matches, 100 matches).
- 7.4. The chosen measurement location for the Holtz Acoustics noise survey is partially or fully screened from various parts of the cricket ground. Due to this, this resultant noise levels would not be representative of the highest facade noise levels that would be experienced by the mid and upper level facades of the proposed developments.
- 7.5. A subsequent assessment by Holtz Acoustics has used the source noise levels from a worst-case cricket match (international T20) derived by Vanguardia. These noise levels are used to predict the external noise level and the proposed facades, and then assess the required facade sound insulation to meet the BS 8233:2014 daytime internal noise criterion.

Entertainment event noise sources

- 7.6. There is an existing music noise level limit for concerts at LCCC of $L_{Aeq,15min}$ 80 dB. This applies to existing residential premises which are 1 or 2 storeys in height. It has been confirmed with Trafford Council that this limit should not apply to new residential premises in the vicinity of LCCC. This is because the limit is a compromise with what is achievable with the existing layout of LCCC and the surrounding residential premises, and new residential premises should not be exposed to this high noise level without mitigation in place.
- 7.7. Even with the existing music noise limit for concerts, the freedom of information request provided by Richard Pollitt on 10 December 2021 stated that complaints from local residents in the vicinity of LCCC are commonly reported. This indicates that if this limit were used for new residential developments, additional complaints would be likely.
- 7.8. Up to seven live music concerts can be held at LCCC each year. Initially Holtz Acoustics did not carry out a noise survey during a concert, though following the appeal being lodged, a noise survey was carried out in September 2021 during a Courteeners concert. Vanguardia also carried out a noise survey during this concert.
- 7.9. Measurement position 1 used in the Holtz Acoustics survey is mainly screened from the main loudspeaker arrays and the crowd by the LCCC shop building (located between the stands and the development site) and therefore would not be representative of the parts of the proposed facade with direct line of sight to the LCCC. Due to this the noise measurements should not be relied as input for an environmental noise model because there will be a large amount of uncertainty with the screening corrections that would be implemented.
- 7.10. Measurement position 2 is significantly further away from the loudspeaker arrays compared to the worst-case facade location. This increases the uncertainty associated with the subsequent noise modelling of the concert. It is noted that there were access issues, however, Vanguardia were able to measure noise levels in a location unscreened from the main loudspeaker arrays at high level, during the same event. I consider this measurement location to be largely representative of noise levels expected to be experienced at the facade of the proposed development, once a slight change in distance and facade reflections are accounted for.
- 7.11. The Holtz Acoustics predicted facade noise levels from a live music concert event differ significantly from Vanguardia's predictions:
 - Holtz Acoustics predict facade noise levels of $L_{Aeq,15min}$ 70-78 dB, increasing to the upper end of the range in locations unscreened from the loudspeakers.
 - Vanguardia predict facade noise levels of $L_{Aeq,15min}$ 70-90 dB, also increasing to the upper end of the range in locations unscreened from the loudspeakers

- 7.12. The difference is clearly indicated at the mixing desk location. Holtz Acoustics predict a noise level of L_{Aeq} 90-95 dB at the mixing desk location, whereas Vanguardia predict L_{Aeq} 100 dB.
- 7.13. Based on the email correspondence from Richard Pollitt on 15 November 2021 I understand that Vanguardia's predictions are considered representative by Trafford Council Environmental Health Officers.
- 7.14. Further review of the noise modelling methodologies indicates the following:
- Holtz Acoustics have modelled loudspeakers as point sources. This is not representative of line array loudspeakers, which Vanguardia have confirmed that LCCC use, which have different attenuation with distance compared to point sources.
Line arrays in the nearfield have a very limited attenuation with distance, then have a distance attenuation of typically 3 dB per doubling of distance. At very large distances line arrays behave like point sources and exhibit an attenuation of 6 dB per doubling of distance.
The incorrect assumption of a point source reduces the predicted facade noise level.
 - Vanguardia also note that as well as the main loudspeaker arrays facing away from the stage there are also left-side, and right-side loudspeaker arrays that provide coverage to the north and south stands that flank the stage. The right-side loudspeaker array would likely have partial coverage of the proposed development and increase the predicted facade noise level (compared the Holtz Acoustics predictions which do not account for this).
- 7.15. Given the location of the noise measurements carried out and the methodology used to model the loudspeaker arrays, Vanguardia's approach is expected to provide more representative results and should be relied on as a point of reference.
- 7.16. Typically, a statistical study of measured noise levels (in 15 minute periods) from a live music concert would be carried out. The findings of this would give justification to use a particular noise level as the basis for the noise ingress assessment.
- 7.17. The Holtz Acoustics assessment only shows the predicted noise level from concerts at 1.5 m above ground height. It would be expected that assessments provide grid responses for predicted noise levels for upper levels of the proposed development.

8 Comments on building envelope design

Facade sound insulation

- 8.1. Assessments of the required facade sound insulation have been carried out for transport noise sources and for sporting events at LCCC. These indicated that high performance double glazing and high performance acoustic trickle vents would be required to achieve the target internal noise level criteria. Typically, single figure values associated with the facade sound insulation performance requirements would be clearly set out in terms of R_w+C_{tr} , as this is a more useful/typical parameter to specify the facade sound insulation, particularly when considering transport noise sources. This has not been done.
- 8.2. With regards to live music noise affecting the proposed development Holtz Acoustics initially stated the following in section 4.4.3 of *Great Stone Road, Acoustic Design Statement, Vibration Assessment and Plant Noise Limits Report*:

'It will not be possible to fully mitigate live music noise through scheme design and the extent to which residents are disturbed by one off concerts is likely to be linked to their sensitivity to noise'.
- 8.3. This statement indicates the adoption of an incorrect approach, as the Agent of Change principle applies (as set out in the *National Planning Policy Framework* July 2021, paragraph 187 and the *Planning Practice Guidance*, paragraph: 009 Reference ID: 30-009-20190722).
- 8.4. If the new development cannot suitably mitigate live music noise, then disturbance of occupants and potential complaints to Trafford Council would be likely. This would in turn potentially affect the current LCCC operations.
- 8.5. Following the objection being lodged by LCCC, Holtz Acoustics have modelled the music noise levels from a concert at LCCC (see previous section). However, no assessment of the facade sound insulation, to achieve suitable internal noise levels in the proposed development, has been carried out. This is concerning given that high external noise levels at the facade are expected.
- 8.6. A reasonable approach would be to achieve internal noise level criteria in line with BS 8233: 2014 in the proposed residential development at all times, including during all events at LCCC. This to protect future residential amenity while still allowing LCCC to operate as they do currently, in line with the Agent of Change principle. Note that this would not mean noise from events, particularly music concerts, would be inaudible in apartments. I consider this a reasonable compromise but there would still therefore be potential for complaints during noisy events.

- 8.7. In addition, a specific assessment of low-frequency noise ingress and facade sound insulation has not been carried out. This is important as live music is dominated by low frequency sound and building envelope constructions typically have lower sound insulation performances at low frequencies.
- 8.8. Reasonable limits for entertainment noise ingress to residential dwellings that I would expect to be targeted in habitable rooms during live music concerts at LCCC are:
- $L_{eq,15mins}$ 47 dB in the 63 Hz octave band
 - $L_{eq,15mins}$ 41 dB in the 125 Hz octave band.
- 8.9. A 15 minute period has been suggested for ease of analysing external noise levels in conjunction with the A-weighted external noise levels. These limits align with those used on at a recent development at Trafford Wharf and those adopted for city centre developments by Manchester City Council.
- 8.10. In practice the application of a noise limit in the 63 Hz octave band is difficult to determine. There are a few reasons for this:
- Sound insulation data for construction elements are unreliable at frequencies below 100 Hz. Test laboratories are not generally calibrated for measurements below this and round robin tests between laboratories have indicated wide variations in measured low frequency values for similar elements.
 - The sound field within a room at low frequencies is not diffuse. Modal variations mean low frequency sound levels can vary significantly at different positions within a room. This can depend on room dimensions and can also change with the addition of furniture.
 - The low frequency sound insulation provided by an element can be altered significantly by the dimensions of the element. For example, the tested performance of a window with a certain pane size in a laboratory, could change considerably with different pane sizes.
- 8.11. Therefore it would be necessary to provide an additional margin in the specified facade sound insulation be included to account for the uncertainty.
- 8.12. Based on the worst-case predicted music noise levels at the proposed facade from Holtz (L_{Aeq} 78 dB) and the facade sound insulation proposed by Holtz the expected internal noise levels would be approximately L_{Aeq} 41 dB. This is an estimate as octave-band music noise levels at the proposed facade are not provided.
- 8.13. Based on the worst-case predicted music noise levels at the proposed facade from Vanguardia (L_{Aeq} 90 dB) and the facade sound insulation proposed by Holtz the expected internal noise levels would be approximately L_{Aeq} 53 dB. This is an estimate as octave-band music noise levels at the proposed facade are not provided.

- 8.14. Both these predictions result in internal noise levels in the proposed development that are unacceptable and would likely cause disturbance to occupants. The proposed architectural layouts indicate that around 65 apartments would be affected by high external music noise levels. Though the environmental noise model would need to be analysed to assess the exact number of apartments affected.
- 8.15. To achieve the BS 8233: 2014 daytime internal noise criteria, based on the worst-case predicted music noise levels at the proposed facade from Vanguardia (L_{Aeq} 90 dB), the required overall facade sound insulation performance would be approximately R'_w+C_{tr} 48-50 dB. This performance cannot be achieved by standard commercially available double glazing, and would require mechanical ventilation.
- 8.16. To achieve the overall facade sound insulation performance set out above would likely require changes to the building massing and/or layout to incorporate winter gardens or circulation space as a buffer space on the north-east facade. It is noted that central corridor layout of the scheme does not easily lend itself to having circulation space relocated to an external elevation

Acoustics, ventilation and overheating

- 8.17. The internal noise criteria set out in BS 8233:2014 consider a 'whole dwelling ventilation' condition (as defined in Approved Document F to the Building Regulations 2010, incorporating 2010 and 2013 amendments). During periods of overheating additional ventilative cooling would typically be needed.
- 8.18. The Holtz Acoustics documents state that overheating, and the related effects on the acoustic design will be assessed during the detailed design stage. No discussion, assessment or guidance relating to acoustics, ventilation and overheating is provided. While it is expected that this will be investigated further during the detail design, a Level 1 acoustics, ventilation and overheating assessment (in line with Association of Noise Consultants (ANC) *Acoustics Ventilation and Overheating, residential Design Guide*) should have been carried out as a minimum at this stage. This would allow elevations with increased risk to be identified and a high level strategy to be established.

9 Comments on other issues

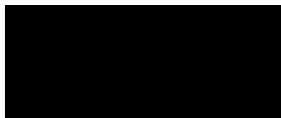
- 9.1. While an assessment of tactile vibration from nearby Metrolink tram line has been carried out an assessment of ground borne re-radiated noise has not. This is necessary to identify if the prevailing ground conditions and proximity to the tram line would cause unsuitable internal noise levels within the proposed residential development.
- 9.2. The assessment of ground borne re-radiated noise should have been carried out in line with the Association of Noise Consultants (ANC) guidelines *Measurement and assessment of ground-borne noise and vibration*, 3rd edition published in 2020.

10 Conclusions

- 10.1. My key conclusion is that the music noise egress from concerts at LCCC should be assessed in line with Vanguardia's noise survey data and noise modelling, and that the facade sound insulation is assessed based on achieving the BS 8233: 2014 internal noise level during a live music concert at LCCC.
- 10.2. The current acoustic design of the proposed development does not meet the above criteria. If the current design was progressed there would likely be disturbance caused by high levels of music noise ingress and increased likelihood of complaints to Trafford Council. This would in turn potentially affect the current LCCC operations contrary to the Agent of Change principle.
- 10.3. I have the following other concerns:
 - A statement reviewing any potential changes to noise sources in the vicinity of the development site, since the time of the original noise survey being carried out has not been provided.
 - Maximum noise levels (L_{AFmax}) at night-time from transport noise sources for each elevation have not been identified.
 - The music noise modelling does not account for the loudspeaker layout and the loudspeaker distance attenuation. This should have been calibrated to noise levels measured by Vanguardia at the mixing desk location and at high level adjacent to the LCCC shop building.
If necessary additional noise measurements at high level at the expected worst case facade location during a concert should be carried out.
 - Gird responses for predicted noise levels from live music concerts at LCCC for upper levels of the proposed development are not provided.
 - A detailed assessment of internal noise levels within residential apartments during a live music concert at LCCC has not been carried out. This should have included specific assessment of low frequency noise levels.
 - A Level 1 acoustics, ventilation and overheating assessment has not been carried out in line with Association of Noise Consultants (ANC) *Acoustics Ventilation and Overheating, residential Design Guide* (2020). This should have allowed a suitable strategy to be identified to control noise ingress during periods where additional ventilative cooling is required.
 - An assessment of ground borne re-radiated noise has not been carried out in line with the Association of Noise Consultants (ANC) guidelines *Measurement and assessment of ground-borne noise and vibration*, 3rd edition published 2020.

11 Statement of truth

11.1. I confirm that I have made clear which facts and matters referred to in this report are within my own knowledge and which are not. Those that are within my own knowledge I confirm to be true. The opinions I have expressed represent my true and complete professional opinions on the matters to which they refer in accordance with my professional obligations. I understand my first duty is to the tribunal not to my client.



Matthew Robinson

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Appendix A

Glossary

General terms

Airborne sound	Sound propagating through the air.
Airborne sound insulation	The ability of building elements or structures to reduce airborne sound transmission.
Frequency	The number of cycles per second. The unit of frequency is the Hertz (Hz). Frequency gives a sound its distinctive tone.
Frequency band	A continuous range of frequencies between stated upper and lower limits (see also 'Octave band' and 'One-third octave band').
Ground-borne noise	Noise which is transferred by vibration of the ground (and can be re-radiated as noise within a building)
Ground-borne vibration	Vibration which is transferred via the ground.
Sound pressure level	A logarithmic measure of the effective sound pressure of a sound relative to a reference value, measured in decibels, dB. Sound pressure levels are dependent on the conditions under which they are measured.
Spectrum	The composition of a particular sound in terms of separate frequency bands.
Structure-borne sound	Sound which is transferred by vibration via the structure of a building.

Acoustic parameters

'A' weighting	Frequency weighting based on the frequency response of the human ear which has been found to correlate well with the subjective response to sound.
C_{tr}	The correction to a sound insulation quantity (such as R_w or $D_{nT,w}$) to take account of a specific sound spectrum with low frequency sound energy.
Decibel (dB)	A logarithmic unit used for many acoustic values to indicate the level with respect to a reference level
Hz	Hertz (Hz) is the unit of frequency (see also 'Frequency')
$L_{n,f}$	The impact sound pressure level in a stated frequency band, flanking via a floor connecting adjacent rooms. A lower numerical quantity represents a better performance.
$L_{n,f,w}$	A single number weighted quantity used to characterize the flanking impact sound pressure level via a floor connecting adjacent rooms. A lower numerical quantity represents a better performance.
L'_{nT}	The impact sound pressure level in a stated frequency band, corrected for the reverberation time. A lower numerical quantity represents a better performance.
$L'_{nT,w}$	A single number weighted quantity used to characterise the impact sound insulation of floors. A lower numerical quantity represents a better performance.

$L_{Aeq,T}$	Equivalent A-weighted sound pressure level of a steady noise that has the same acoustic energy as a fluctuating noise over the measurement period (T). When not weighted it is denoted $L_{eq,T}$.
$L_{Amax,T}$	The highest A-weighted sound pressure level measured in the period (T) with either fast (L_{AFmax}) or slow (L_{ASmax}) time weightings. When not weighted it is denoted L_{Fmax} or L_{Smax} .
Octave band	A frequency band in which the upper limit of the band is twice the frequency of the lower limit.
One-third octave band	A frequency band in which the upper limit of the band is the cube root of two times the lower limit of the band or more simply one third of an octave band.
RMS acceleration	RMS acceleration levels in each of three axes in one-third-octave bands, measured using the 'slow response' exponential time weighting.
R	Sound reduction index. A quantity, measured in a laboratory, which characterises the airborne sound insulation of a material or building element in a stated frequency band. A higher numerical quantity represents a better performance.
R_w	Weighted sound reduction index. A single number quantity which characterises the airborne sound insulation of a material or building element in the laboratory. A higher numerical quantity represents a better performance.
R'	Apparent sound reduction index. The on-site equivalent of the sound reduction index, R , which is measured in the presence of flanking paths. A higher numerical quantity represents a better performance.
R'_w	Apparent weighted sound reduction index. The on-site equivalent of the weighted sound reduction index, R_w . A higher numerical quantity represents a better performance.
VDV	Vibration Dose is a parameter that combines the magnitude of vibration and the time for which it occurs. When assessing intermittent or time-varying vibration it is necessary to use the Vibration Dose Value (VDV), a cumulative measurement of the vibration level received over an 8-hour or 16-hour period.

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Consultants in Acoustics, Noise & Vibration

Appendix B

Richard Pollitt, Trafford Council email correspondence (to Debra Harrison), sent 15 November 2021

Harrison, Debra

From: Pollitt, Richard
Sent: 15 November 2021 14:25
To: Harrison, Debra
Cc: Belfield, Peter
Subject: FW: Former B & Q, Greatstone Road. Appellant Noise Evidence

Debra,

I have reviewed the three documents produced by Holtz Acoustics produced in relation to the disputed noise issues associated with the proposed residential development at the former B & Q site, Greatstone Road, Stretford. I would like to confirm the following additional information.

Noise from Concerts

Lancashire County Cricket Club (LCCC) hold a license which allows the hosting of large scale music concerts, a condition of the license is the requirement that music noise levels (MNL) do not exceed 80 dB LAeq,15min at certain residential receptors. If the Council were ever required review the premises license this could potentially have the outcome of significantly affecting the viability of concerts being held at LCCC. Members of public may also call for the review of a premises license.

Holtz Acoustics have undertaken noise modelling of a concert event held at Lancashire County Cricket Club utilising data collected during the recent Courteeners concert. Our review of the noise model provided by Holtz finds that the noise levels associated with concerts has potentially been underestimated. The model suggests that noise levels at the usual front of house concert noise monitoring location/mixing desk would be below 95dB. Our experience, and supporting data from Vanguardia over many years of noise monitoring during concerts, suggests that this would not be the case and that noise levels would be more likely to be those as referred to in the recent Vanguardia report reference APP/Q4245/W/20/3258552 VC-103597-EA-RP-001 R02. There are significant differences between the Vanguardia noise model and the Holtz noise model which will need to be resolved. However, we feel that the Vanguardia noise model is potentially more representative, based on our experience, of noise levels achieved during music concerts at LCCC.

The positioning of the noise monitoring undertaken by Holtz acoustics in appendix B does not give confidence that representative noise measurements were taken during the recent LCCC concert that were used to inform the Holz noise model.

At this stage the noise model from Holtz Acoustics does not give sufficient reassurance that concert music noise at the proposed development will not result in adverse impact to residents and potentially could lead to justified noise complaints being received by Trafford Council. Justified noise complaints received by the Council could result in the LCCC premises license being reviewed to the detriment of concerts being held at LCCC.

Holtz Acoustics have relied upon the licensing noise condition as being a suitable criteria in relation to assessing noise impacts from concerts on future residents. However, the Council would have expected to see detailed calculations of internal noise levels occurring during concert events, which should include low frequency noise assessment, with a subsequent review against a suitable criteria.

The insulation specification, detailed in appendix F, appears to rely on the laboratory performance of the glazing provided and does not consider that the on-site performance may be compromised by low frequency effects and installation issues, these should be referred to within in the calculations.

It is the recommendation of Regulatory Services that the Council should commission an independent review of the objector and applicants submissions to provide specialist advice on how noise impacts from LCCC operations can be assessed and mitigated to reduce impacts on future site users.

Noise from Sporting Events

Noise from activities at Lancashire County Cricket Club (LCCC) associated with cricket matches and associated noise (e.g. music 'stings', crowd noise, plant and machinery) are not controlled by any license and any noise complaints received by Trafford Council would be investigated under statutory nuisance legislation.

Holtz Acoustics have carried out a further assessment of noise associated with cricket matches, a noise model has been produced which is based on the worst case stand noise levels given in the Vanguardia report reference APP/Q4245/W/20/3258552 VC-103597-EA-RP-001 R02 which was used to model a full capacity cricket ground.

Whilst Holtz report that original insulation specification would be sufficient to protect residents from noise during sporting events, this conclusion cannot yet be supported in view of the comments provided above in relation to concert noise and the potential for cumulative impacts from all LCCC operations.

Holtz refer to trickle vents as being the primary method of ventilation whilst windows are closed during cricket matches and concerts, however, both cricket matches and concerts will occur during warmer months and trickle ventilation may be an inadequate alternative to opening windows during warmer weather. It is felt that a specification should be provided of mechanical ventilation and heat recovery to confirm that a realistic alternative to opening windows is available to residents during matches and events held at LCCC.

Conclusion

Our review of the Holtz Acoustic report finds that there are number of areas of concern where we are not satisfied that impacts to future site users will be within reasonable margins. It has not been satisfactorily concluded that concert noise from LCCC will not exceed the license criteria at the proposed development or will meet appropriate planning criteria. Further assessment will be required to fully assess noise from operations at LCCC and what level of mitigation will be required.

Planning Conditions

In relation to including BS 8233 as the basis of the suggested planning conditions, the Council should seek specialist acoustic advice in relation to applying appropriate criteria due to the range of operations which are held at LCCC. An independent review of the objector and applicants submissions is needed to provide specialist advice on how noise impacts from LCCC operations can be assessed and mitigated to reduce impacts on future site users.

Regards

Richard Pollitt
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Consultants in Acoustics, Noise & Vibration

Appendix C

Richard Pollitt, Trafford Council email correspondence (to Matthew Robinson), sent 10 December 2021

Matthew Robinson

From: Pollitt, Richard <Richard.Pollitt@trafford.gov.uk>
Sent: 10 December 2021 11:11
To: Matthew Robinson
Subject: FW: Trafford Council Data Inquiry [Filed 11 Dec 2021 19:29]

Follow Up Flag: Flag for follow up
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Hi Matt,

As you may be aware, Holtz Acoustics submitted an FOI yesterday in relation to complaints received by the Council about concerts at LCCC. Rebecca Coley asked me to copy you in on my response, please see below.

Regards

Richard.

Richard Pollitt
Team Leader (Environmental Protection)
Trafford Council
Trafford Town Hall
Talbot Road
Stretford
Richard.pollitt@trafford.gov.uk
0161 912 4568

From: Pollitt, Richard
Sent: 10 December 2021 11:09
To: 'James Patterson' <james@holtzacoustics.uk>
Subject: Trafford Council Data Inquiry

Dear James,

Thank you for your email of 9 December 2021 where you requested information about complaints made to Trafford Council in relation to noise from concert events held at Lancashire County Cricket Club between 1st January 2011 and 9 December 2021. The information requested is presented below:

Year	Artist	Complaint Numbers
2011	Kings of Leon	4
2011	Bon Jovi	2
2012	No concerts held	-
2013	No concerts held	-
2014	No concerts held	-
2015	Foo Fighters	42

2016	Rihanna	103
2016	Beyonce	31
2017	Courteeners	4
2017	One Love	0
2017	Radiohead	1
2018	Liam Gallagher	1
2019	No concerts held	-
2020	No concerts held	-
2021	Courteeners	1

Complaints received regarding noise from concerts at the LCCC Old Trafford venue are reviewed during and after each event with visits made to complaint addresses where possible whilst concerts are taking place to take noise measurements. Information is provided to complainants on compliance with the noise limits specified within the Premises Licence conditions. Complainants will be informed of the monitoring made by Council officers in conjunction with acoustic consultants employed by Lancashire County Cricket Club to ensure that the Premises Licence noise limit is met at the locations stipulated within the Licence.

Additional off site monitoring is undertaken by Council Officers for successive concert events if required. Noise complaints received and their distribution are reported to a de-brief meeting of the concert multi-agency safety advisory group. If necessary, additional noise mitigation measures will be requested and agreed at the meeting to address any areas of concern. These measures are reflected in the updated Noise Management Plan provided to the Council before each concert.

If you have any questions about the information, please contact me.

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