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PROPOSED SHELTERED HOUSING DEVELOPMENT AT THE FORMER BUZZ BINGO SITE, CASTLE STREET, BANBURY

NOISE IMPACT ASSESSMENT

Technical Report: R9265-2 Rev 1

Date: 07th December 2021

For: Planning Issues Ltd
Churchill House
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24 Acoustics Document Control Sheet

Project Title: Proposed Sheltered Housing Development at the Former Buzz Bingo site, Castle Street Banbury - Noise Impact Assessment

Report Ref: R9265-2 Rev 1

Date: 7th December 2021

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For and on behalf of 24 Acoustics Ltd				

Document Status and Approval Schedule

Revision	Description	Prepared By	Reviewed By	Approved By
0	Approved for issue	Andre Pires	Reuben Peckham	Reuben Peckham

SUMMARY

Planning Issues Ltd has retained 24 Acoustics Ltd to carry out a noise impact assessment on a site at the former Buzz Bingo premises in Castle Street, Banbury. It is proposed to redevelop the site for sheltered housing.

The site is affected by noise from road traffic using North Bar Street and Castle Street as well as operational noise from a neighbouring tyre shop/car garage unit, Land Tyre Service.

The assessment has indicated that noise impact from operations at Land Tyre Service will be low with the specific mitigation in place.

Noise levels in the external amenity areas will be within the constraints identified in British Standard 8233. However, the area of the site fronting Castle Road will be subject to greater noise levels.

In order to achieve acceptable internal noise levels it will be necessary to specify acoustic glazing and alternative means of ventilation to some areas of the development. An indicative specification has been provided and this should be updated as part of the detailed design of the scheme (post planning).

On the above basis, it is considered that an appropriate acoustic environment can be provided to the proposed residential properties, both externally and internally, and there is considered no reason, on noise grounds, why planning consent should be refused.

CONTENTS

1.0 INTRODUCTION

1.1 Planning Issues Ltd has retained 24 Acoustics Ltd to carry out a noise impact assessment on a site at Buzz Bingo, Castle Street, Banbury. It is proposed to redevelop the site for sheltered housing.

1.2 The site is potentially affected by noise from road traffic using North Bar Street and Castle Street as well as operational noise from a neighbouring tyre shop/car garage unit called Land Tyre Service.

1.3 This report provides the results of the noise assessment. An explanation of noise and vibration terms used in this report is provided in Appendix A. All sound pressure levels in this report are given in dB re: 20 µPa.

2.0 SITE DESCRIPTION AND PROPOSED DEVELOPMENT

2.1 The site is located the crossroads of North Bar Street and Castle Street, Banbury town centre in a mixed residential and commercial area. Figure 1 provides an aerial image of the area.

2.2 Planning consent is sought to construct 80 retirement living units in a three storey building and together with a car park for 27 vehicles. The proposed development scheme is shown in Figure 2.

2.3 There is potential for the development to be affected from road traffic noise as well as operation noise from a neighbouring tyre shop/car garage unit - Land Tyre Service.

3.0 STANDARDS AND GUIDANCE

National Planning Policy Framework and Noise Policy Statement for England

3.1 Paragraph 180 of the National Planning Policy Framework (NPPF) [Reference 1] states that planning policies and decisions should:

a) mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life;
b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.

3.2 The NPPF also refers to the Noise Policy Statement for England (NPSE) [Reference 2] which is intended to apply to all forms of noise, including environmental noise, neighbour noise and neighbourhood noise. The NPSE sets out the Government's long-term vision to 'promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development' which is supported by the following aims.

- Avoid significant adverse impacts on health and quality of life;
- Mitigate and minimise adverse impacts on health and quality of life.

3.3 The NPSE defines the concept of a 'significant observed adverse effect level' (SOAEL) as 'the level above which significant adverse effects on health and quality of life occur'. The following guidance is provided within the NPSE:

> *"It is not possible to have a single objective noise-based measure that defines SOAEL that is applicable to all sources of noise in all situations. Consequently, the SOAEL is likely to be different for different noise sources, for different receptors and at different times. It is acknowledged that further research is required to increase our understanding of what may constitute a significant adverse impact on health and quality of life from noise. However, not having specific SOAEL values in the NPSE provides the necessary policy flexibility until further evidence and suitable guidance is available."*

3.4 The Planning Practice Guidance (PPG) [Reference 3] is written to support the NPPF with more specific planning guidance. The PPG reflects the NPSE and states that noise needs to be considered when new developments may create additional noise and when new developments would be sensitive to the prevailing acoustic environment. It also states that opportunities should be taken, where practicable, to achieve improvements to the acoustic environment. The PPG states that noise can over-ride other planning concerns but should be considered in the context of the wider characteristics of the development proposal, its likely users and its surroundings.

3.5 The PPG expands upon the concept of SOAEL (together with Lowest Observable Adverse Effect Level, LOAEL and No Observed Effect Level, NOEL) as introduced in the NPSE and provides a table of noise exposure hierarchy for use in noise impact assessments in the planning system.

3.6 The NPPF, NPSE and PPG documents do not refer to specific noise criteria. For residential developments 24 Acoustics considers that the spirit of the requirements of the NPPF and NPSE will be complied with if criteria from British Standard 8233: 2014 and guidance from the World Health Organisation are adopted for internal noise levels within dwellings.

Professional Practice Guidance on Planning & Noise (ProPG)

3.7 The Professional Practice Guidance on Planning and Noise (ProPG) [Reference 4] was published jointly by the Association of Noise Consultants, Institute of Acoustics and Chartered Institute of Environmental Health in May 2017. The guidance relates to the consideration of existing sources of transportation noise upon proposed new residential development and strives to:

- Advocate full consideration of the acoustic environment from the earliest possible stage of the development control process;
- Encourage the process of good acoustic design in and around new residential developments;
- Outline what should be taken into account in deciding planning applications for new noise-sensitive developments;
- Improve understanding of how to determine the extent of potential noise impact and effect; and
- Assist the delivery of sustainable development.

3.8 The guidance describes a recommended approach for new residential development, which includes four key elements of the assessment process, identified below:

i. Good acoustic design process;
ii. Internal noise level guidelines;
iii. External amenity area noise assessment;
iv. Assessment of other relevant issues.

3.9 It is important to note that the guidance in ProPG does not constitute an official government code of practice and neither replaces nor provides an authoritative interpretation of the law or government policy.

BS 8233:2014 and WHO Guidelines

3.10 BS 8233:2014 [Reference 5] provides design guidance for dwelling houses, flats and rooms in residential use and recommends that internal noise levels in dwellings do not exceed 35 dB $L_{Aeq,16hr}$ in living rooms and bedrooms during the day, 40 dB $L_{Aeq,16hr}$ in dining rooms during the day and 30 dB $L_{Aeq,8hr}$ in bedrooms at night. A relaxation of 5 dBA in the above figures is given in the standard for rooms which are naturally ventilated (by opening windows).

3.11 BS 8233:2014 also notes that "*Regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance. A guideline value may be set in terms of SEL or $L_{Amax,F}$, depending on the character and number of events per night.*"

3.12 Although the guidelines have no formal standing, the World Health Organisation (WHO) provides guidance on desirable internal noise levels to minimise the risk of sleep disturbance. The WHO 2000 guidelines [Reference 6] suggest internal night-time noise levels not exceeding 30 dB $L_{Aeq,8hr}$ or regularly (10 – 15 times per night) exceeding 45 dB $L_{Amax,f}$ for 'a good night's sleep'.

3.13 BS 8233:2014 suggests an upper guideline value of 55 dB $L_{Aeq,16hr}$ for noise levels in external amenity spaces such as gardens. This is considered an aspirational limit and BS 8233 recognises that the desirable noise levels for external amenity areas are not always achievable in certain locations. BS 8233 also states that development should not be prohibited on the basis of noise levels within external amenity areas.

BS 4142:2014+A1:2019 - Methods for Rating Industrial and Commercial Sound

3.14 BS 4142:2014+A1:2019 provides a method for rating the effects of industrial and commercial sound on residential areas.

3.15 The standard advocates a comparison between the representative measured L_{A90} background noise level and L_{Aeq} noise level from the source being considered. For rating purposes if the noise source is tonal, intermittent or otherwise distinctive in character, a rating correction should be applied.

3.16 The standard states that a difference between the rating level and the background level of around +10 dBA is an indication of a significant adverse impact, depending on the context and a difference of around +5 dBA is likely to be an indication of an adverse impact, also depending on the context. Where the rating level does not exceed the background noise level, this is an indication of the specific sound source having a low impact (depending upon the context).

Summary

3.17 The impact of noise upon the proposed development has been assessed using the following recommended maximum internal noise levels, due to road traffic:

- 35 dB $L_{Aeq,16hr}$ daytime noise level for living rooms;
- 30 dB $L_{Aeq,8hr}$ night-time noise level for bedrooms;
- 45 dB $L_{Amax,f}$ night-time noise levels in bedrooms for regular events;
- Aspirational target limit of 55 dB $L_{Aeq,16hr}$ in external amenity areas.

3.18 The impact of commercial noise has been assessed relative to the prevailing background noise level using the rating methodology of BS4142:2014+A1:2019.

4.0 NOISE AND VIBRATION MEASUREMENTS

Instrumentation

4.1 Unattended noise measurements were undertaken on the site between 19th and 26th October 2021 using the following equipment:

- 2* Rion (Class 1) precision sound level meters Type NL52;
- Brüel and Kjær acoustic calibrator Type 4231.

Noise Measurement Procedure

4.2 The instruments were set up at two locations both boundaries of the site. Location 1 on the west of the site facing North Bar street and location 2 on the car park facing Castle Street as shown in Figure 1. Measurements were also undertaken at a further location (Location 3) on an attended basis to evaluate the noise from the operation of Land Tyre Service.

4.3 In order to assess typical ambient noise levels, the monitors were configured to continuously monitor in five minute sample periods. The meters were set up to measure and store overall A-weighted statistical parameters including the L_{Amax} and L_{Aeq} parameters (measured on fast response). Noise measurements were made in accordance with BS 7445: 1991 'Description and measurement of environmental noise Part 2 - Acquisition of data pertinent to land use' [Reference 9].

4.4 The instrumentation was powered by external batteries and stored in a weatherproof case. Throughout the course of the survey an outdoor microphone windshield was used. The microphone heights were 5m above local grade (first floor of the current building) and the attended survey was 1.5m above local grade. The weather was generally dry with wind speeds less than 5 m/s, however, where weather conditions were unsuitable for noise measurement, data has been removed prior to analysis.

4.5 Calibration of instrumentation was checked before and on completion of the measurements and no drift was found. The calibration of 24 Acoustics' instrumentation is traceable to National Standards.

Measurement Results

4.6 The noise survey results are shown graphically in Appendix B and are summarised in Tables 2 and 3 below. Table 4 shows the Attended noise survey. 24 Acoustics takes the typical L_{Amax} to be the 10th highest L_{Amax} value. Partial data sets marked with a * were at the end of the survey.

Day and Date	Noise Level		
	Daytime Level (07:00 - 23:00) dB $L_{Aeq, 16\ hour}$	**Night-time Level (23:00 – 07:00) dB $L_{Aeq, 8\ hour}$**	**Typical night-time dB $L_{Amax, f}$**
Tuesday 19/10/21	70*	65	83
Wednesday 20/10/21	*72*	65	82
Thursday 21/10/21	*71*	64	82
Friday 22/10/21	*69*	62	79
Saturday 23/10/21	*69*	63	79
Sunday 24/10/21	*69*	63	82
Monday 25/10/21	*69*	63	81
Tuesday 26/10/21	70*	-	-
Average	***70***	**64**	**83 (maximum)**

Table 2: Ambient Noise Levels at Location 1 (* = incomplete period)

Day and Date	Noise Level		
	Daytime Level (07:00 - 23:00) dB $L_{Aeq, 16\ hour}$	**Night-time Level (23:00 – 07:00) dB $L_{Aeq, 8\ hour}$**	**Typical night-time dB $L_{Amax, f}$**
Tuesday 19/10/21	55*	50	66
Wednesday 20/10/21	56	51	67
Thursday 21/10/21	56	48	66
Friday 22/10/21	56	46	65
Saturday 23/10/21	55	47	66
Sunday 24/10/21	54	48	68
Monday 25/10/21	57	48	66
Tuesday 26/10/21	64*	-	-
Average	**58**	**49**	**68 (maximum)**

Table 3: Ambient Noise Levels at Location 2 (* = incomplete period)

5.0 NOISE IMPACT ASSESSMENT

Road Traffic Impact

5.1 An acoustic model of the site has been developed to determine the noise levels across the site from road traffic neighbouring the site. The model has been produced using IMMI 2021 noise mapping software and has used the propagation methodology of ISO 9613 [Reference 8] which takes into account the effects of geometric divergence, acoustic screening and ground and atmospheric absorption. The model has used 100% hard ground (G=1), ambient temperature of 10 degrees C and a relative humidity of 70%. Downwind propagation has been assumed to represent a worst case assessment.

5.2 Figures 3 and 4 show the predicted L_{Aeq} noise contours across the proposed development site for the day and night-time periods at a height of 1.5 m above local grade.

5.3 Figure 3 shows the daytime noise levels across the site. This indicates that the noise level in the external public and private amenity areas at the rear of the site from road traffic noise will not exceed 55 dB $L_{Aeq, 16\ hour}$. However, the area of the site fronting Castle Street will be subject to greater noise levels.

5.4 It will be necessary to design building facades and fenestration systems to ensure that the internal noise guidelines of BS 8233 are complied with. Figure 5 summarises the requirements. It should be noted that background ventilation in accordance with Part F of the Building Regulations [Reference 11] will be required and to some spaces (as shown in Figure 5) these will need to comprise acoustically rated passive wall vents.

5.5 The acoustic design of the façade system must be checked and updated post-planning (we recommend on a plot by plot basis) and prior to the start of construction to reflect any late design changes (room volumes and/ or glazed area dimensions).

Land Tyre Service Impact

5.6 Land Tyre Service area is located in the rear east corner of the proposed building. 24 Acoustics has undertaken noise impact assessments of the noise associated with Land Tyre Service and has established a typical event duration of 30 minutes and noise level of 56 dB $L_{Aeq,\ 30\ mins}$ at a distance of 14 m. This would result in a noise level at the nearest proposed building façade (a distance of approximately 18 m and screened with a 2.4m height brick wall) of around 44 dB $L_{Aeq,\ 30\ min}$.

5.7 Analysis of the noise survey data indicates background noise levels in the region of 50 dB $L_{A90,\ 1\ hour}$ during the day. An indicative assessment of the likely noise impact, undertaken in accordance with the rating methodology of BS 4142:2014+A1:2019 is provided below. A rating correction of + 3 dB has been applied as the sound will be intermittent in character. Table 4 shows the levels from the closest amenity space from Land Tyre Service.

Background noise level, dB $L_{A90,\ 1\ hour}$	50
Specific Source Noise Level, dB $L_{Aeq,\ 1\ hour}$	44
Rating Correction, dBA	+3
Rating noise level, dBA	47
Difference between rating noise level and background noise level	-3

Table 4: Indicative BS 4124 Noise Impact Assessment, Nearest Amenity Space

Table 5 shows the calculated levels at Lounge Patio area

Background noise level, dB $L_{A90,\ 1\ hour}$	39
Specific Source Noise Level, dB $L_{Aeq,\ 1\ hour}$	45
Rating Correction, dBA	+3
Rating noise level, dBA	48
Difference between rating noise level and background noise level	+9

Table 5: Indicative BS 4124 Noise Impact Assessment, Lounge Patio (Prior to Mitigation)

To mitigate the noise from Land Tyre Service at the Lounge Patio the 1.8 meter high electric gate needs to remain close and only operate/open when needed. With this mitigation the difference between rating noise level and background noise level will decrease from +9 to -1dB.

6.0 CONCLUSIONS

6.1 Planning Issues Ltd has retained 24 Acoustics Ltd to carry out a noise impact assessment on a site at Buzz Bingo, Castle Street, Banbury. It is proposed to redevelop the site for sheltered housing.

6.2 The site is affected by noise from road traffic using North Bar Street and Castle Street as well as operational noise from a neighbouring tyre shop/car garage unit - Land Tyre Service.

6.3 The assessment has indicated that noise impact from Land Tyre Service will be low with the specific mitigation in place.

6.4 Noise levels in the external amenity areas will be within the constraints identified in British Standard 8233. However, the area of the site fronting Castle Road will be subject to greater noise

6.5 A comparison of the predicted noise levels has been made with the measured background noise levels in accordance with BS 4142:2014+A1:2019.

6.6 In order to achieve acceptable internal noise levels it will be necessary to specify acoustic glazing and alternative means of ventilation to some areas of the development. An indicative specification has been provided and this should be updated as part of the detailed design of the scheme (post planning).

6.7 On the above basis, it is considered that an appropriate acoustic environment can be provided to the proposed residential properties, both externally and internally, and there is considered no reason, on noise grounds, why planning consent should be refused.

REFERENCES

1. Department for Communities and Local Government. National Planning Policy Framework, 2018.

2. DEFRA. Noise Policy Statement for England, 2010.

3. Department of Communities and Local Government. Planning Practice Guidance, July 2019.

4. Association of Noise Consultants, Institute of Acoustics, Chartered Institute of Environmental Health. Professional Practice Guidance on Planning and Noise, May 2017.

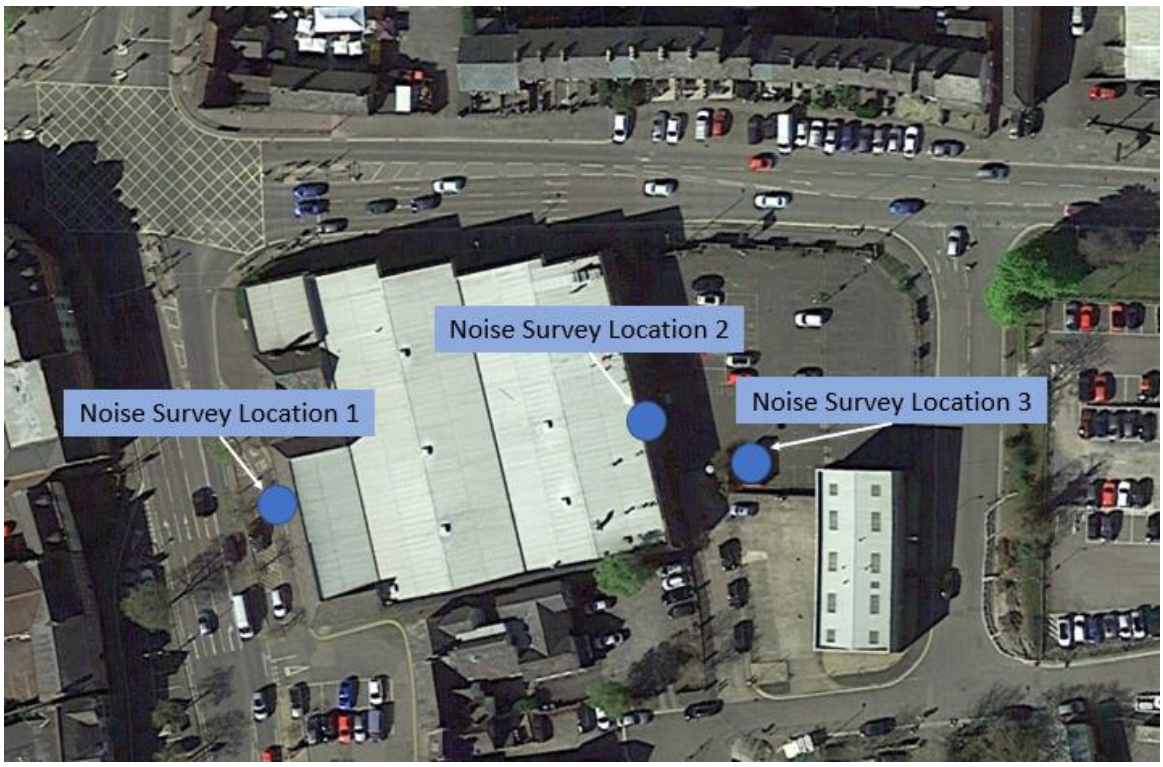
5. British Standards Institution. British Standard 8233:2014 Guidance on sound insulation and noise reduction for buildings, 2014.

6. World Health Organisation. Guidelines for Community Noise, 2000.

7. British Standards Institution. British Standard 4142:2014+A1:2019. Method for rating and assessing industrial and commercial sound, 2019.

8. British Standards Institution. British Standard 7445: 1991 'Description and measurement of environmental noise Part 2 - Acquisition of data pertinent to land use'

9. International Standards Organisation. ISO 9613. Acoustics - Propagation of Environmental Noise, 1997.



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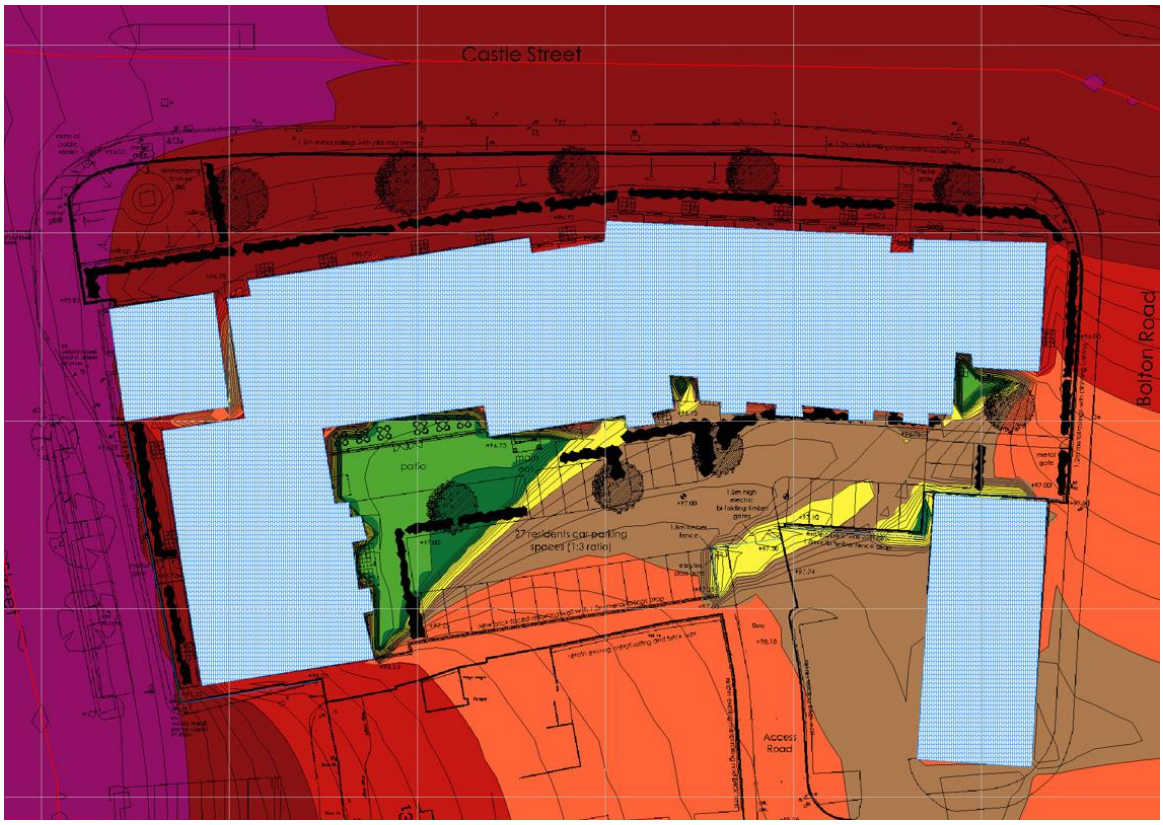
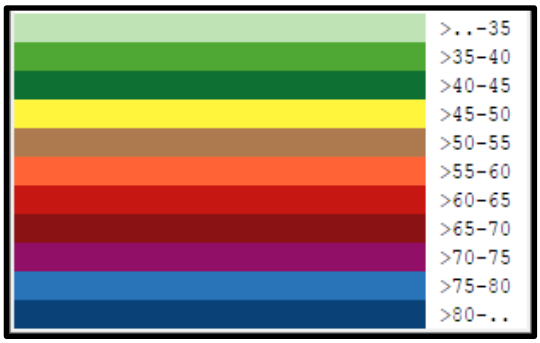
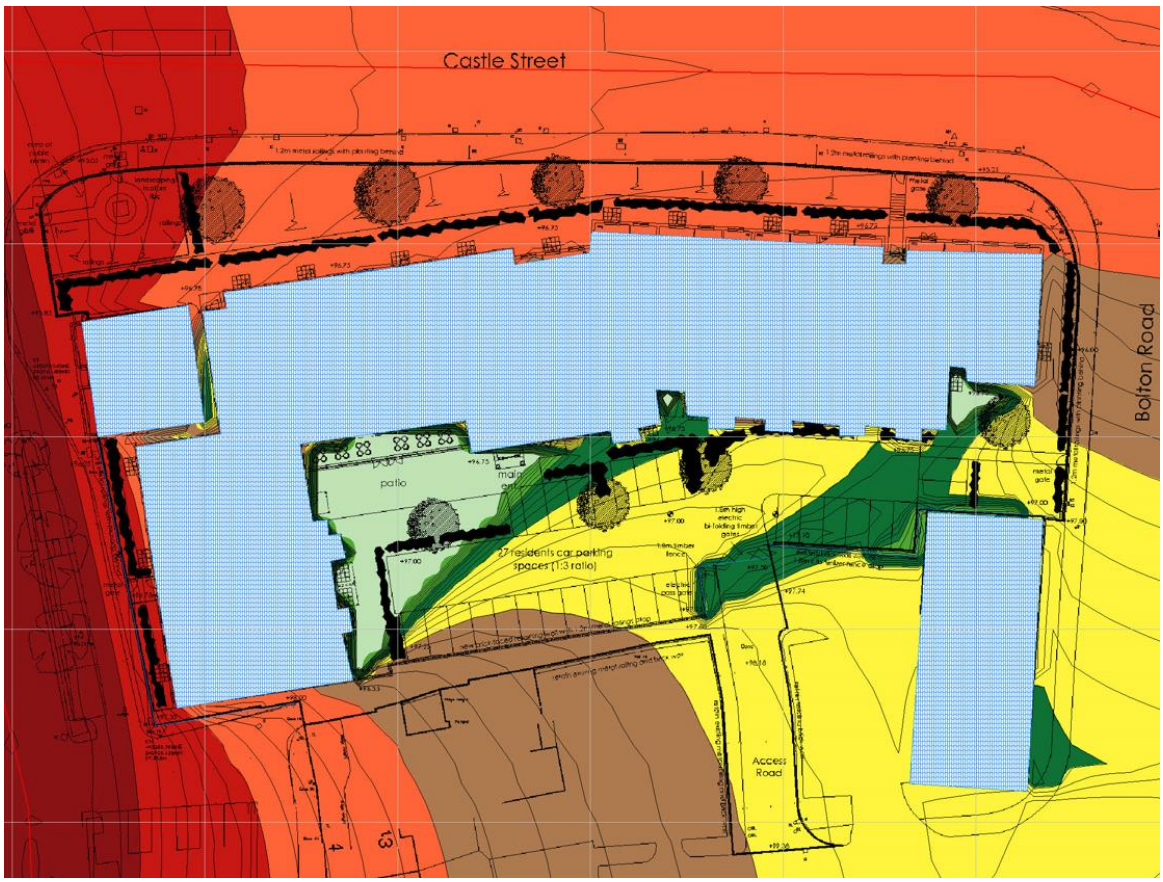
DWG No: Figure 1	**Scale:** N.T.S.	**Rev:** -
Date: Dec 2021	**Drawn By:** AP	**Job No:** 9265

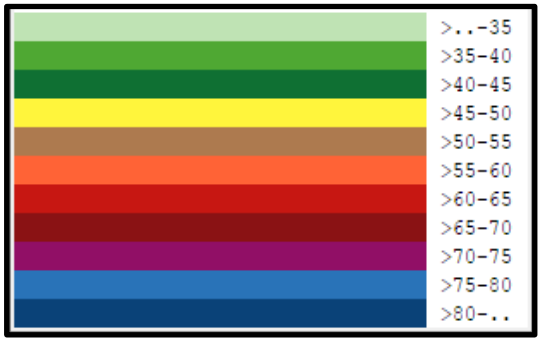
Project: Buzz Bingo, Castle Street Banbury	**Title:** Proposed development scheme		
DWG No: Figure 2	**Scale:** N.T.S.	**Rev:** -	
Date: Dec 2021	**Drawn By:** AP	**Job No:** 9265	





Project: Buzz Bingo, Castle Street Banbury	**Title:** Daytime Noise Contours, dB $L_{Aeq,\ 16\ hr}$		24Acoustics
DWG No: Figure 3	**Scale:** N.T.S.	**Rev:** -	
Date: Dec 2021	**Drawn By:** AP	**Job No:** 9265	





Project: Buzz Bingo, Castle Street Banbury	**Title:** Night time Noise Contours, dB $L_{Aeq, 8\,hr}$		24Acoustics
DWG No: Figure 4	**Scale:** N.T.S.	**Rev:** -	
Date: Dec 2021	**Drawn By:** AP	**Job No:** 9265	

Bedrooms facing East

Windows to achieve the following sound reduction index specification (dB):

125 Hz	250 Hz	500 Hz	1k Hz	2k Hz	4k Hz	10:200:6 mm
35	46	46	46	56	65	

Vents to achieve 49 dB $D_{ne,w}$ or more

Lounges

Windows to achieve the following sound reduction index specification (dB):

125 Hz	250 Hz	500 Hz	1k Hz	2k Hz	4k Hz	6:100:4mm
26	34	44	56	53	52	

Vents to achieve 49 dB $D_{ne,w}$ or more

Bedrooms facing North

Windows to achieve the following sound reduction index specification (dB):

125 Hz	250 Hz	500 Hz	1k Hz	2k Hz	4k Hz	6:100:4mm
26	34	44	56	53	52	

Vents to achieve 49 dB $D_{ne,w}$ or more

Project: Buzz Bingo, Castle Street Banbury	**Title:** Acoustic Glazing and Ventilation Requirements	
DWG No: Figure 5	**Scale:** N.T.S.	**Rev:** -
Date: Dec 2021	**Drawn By:** AP	**Job No:** 9265

APPENDIX A: NOISE & VIBRATION TERMINOLOGY

Noise is defined as unwanted sound. The range of audible sound is from 0 to 140 dB. The frequency response of the ear is usually taken to be around 18 Hz (number of oscillations per second) to 18000 Hz. The ear does not respond equally to different frequencies at the same level. It is more sensitive in the mid-frequency range than the lower and higher frequencies and because of this, the low and high frequency components of a sound are reduced in important by applying a weighting (filtering) circuit to the noise measuring instrument. The weighting which is most widely used and which correlates best with subjective response to noise is the dB(A) weighting. This is an internationally accepted standard for noise measurements.

For variable sources, such as traffic, a difference of 3 dB(A) is just distinguishable. In addition, a doubling of traffic flow will increase the overall noise by 3 dB(A). The 'loudness' of a noise is a purely subjective parameter, but it is generally accepted that an increase/ decrease of 10 dB(A) corresponds to a doubling/ halving in perceived loudness.

External noise levels are rarely steady, but rise and fall according to activities within an area. In attempt to produce a figure that relates this variable noise level to subjective response, a number of noise indices have been developed. These include:

i) The L_{Amax} noise level

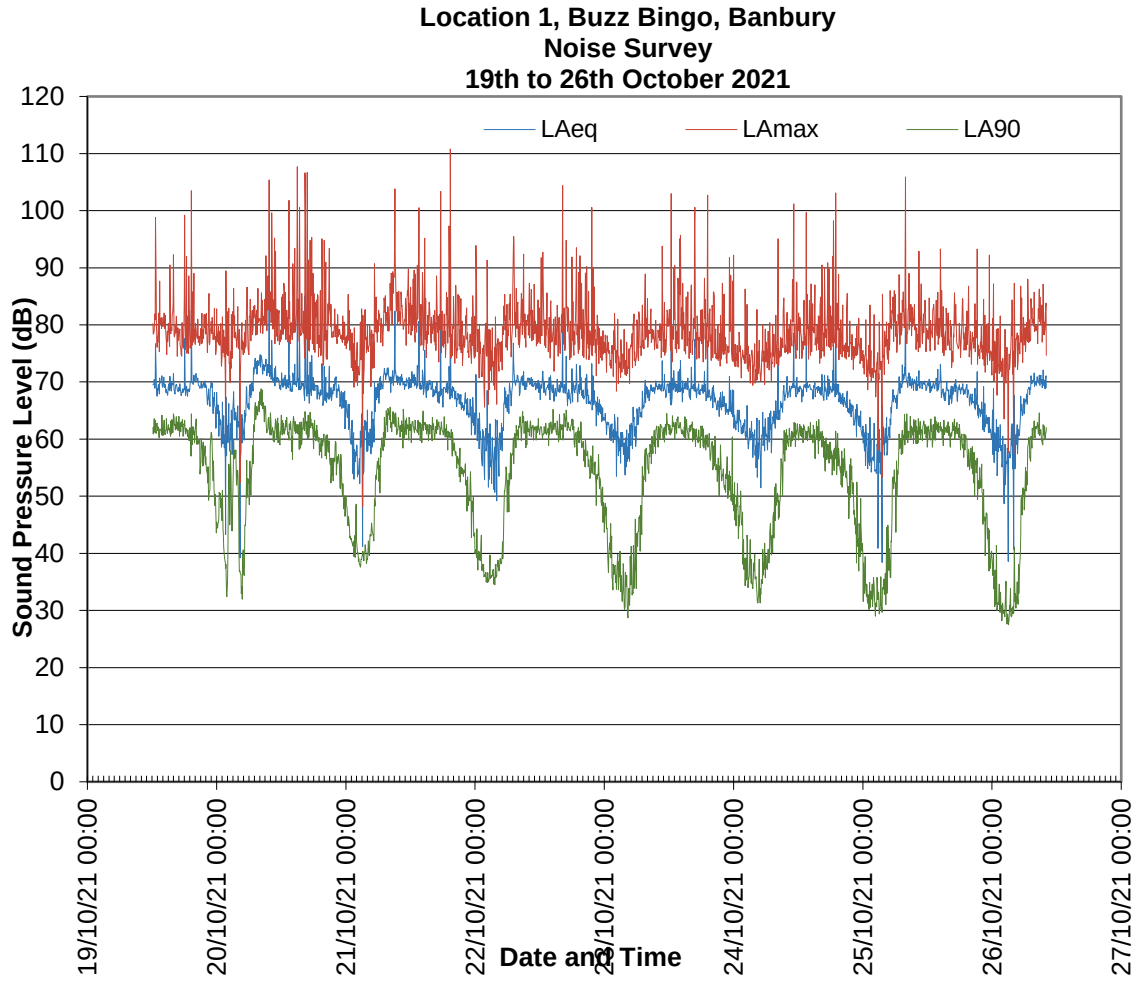
This is the maximum noise level recorded over the measurement period.

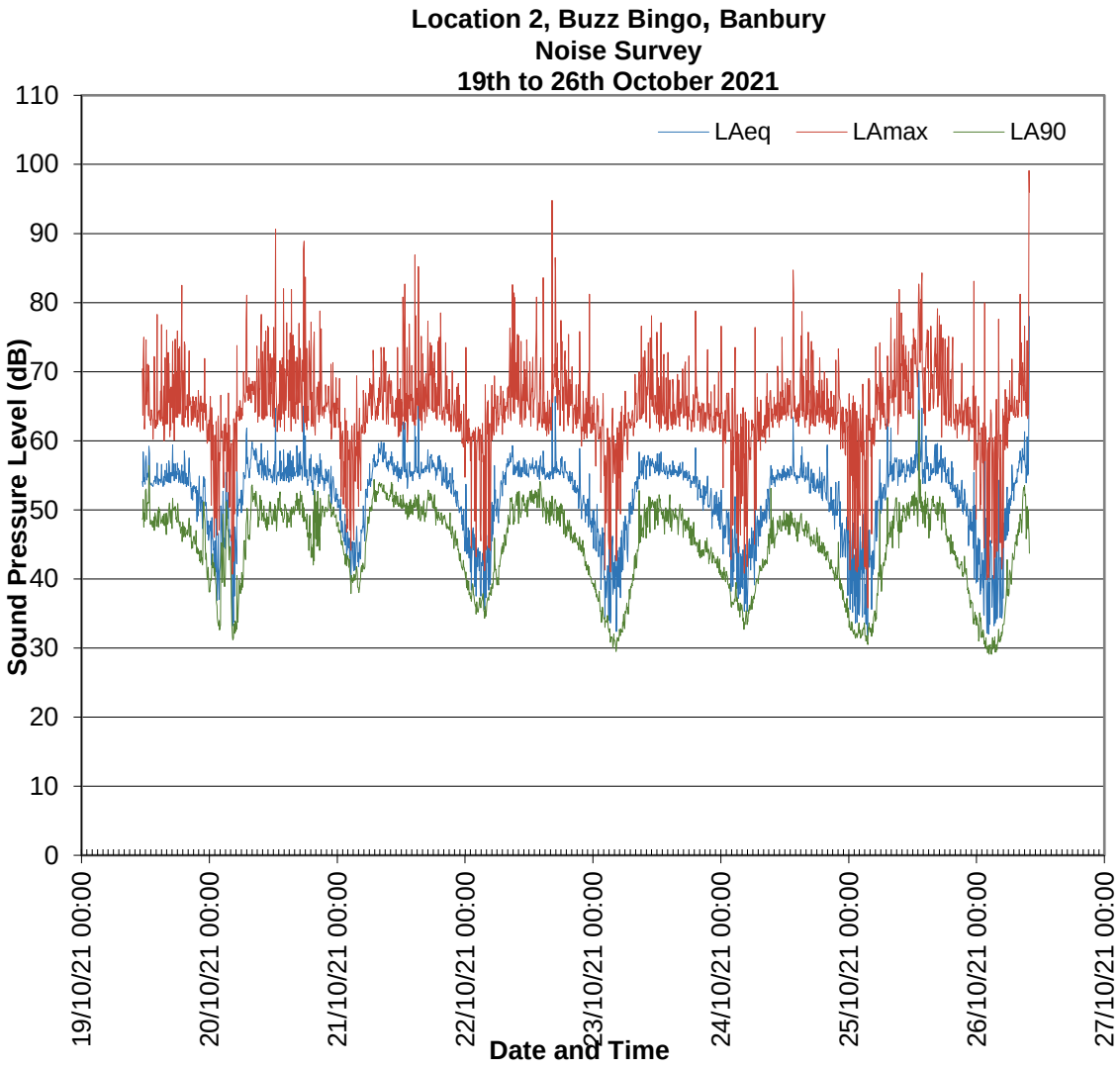
ii) The L_{Aeq} noise level

This is "equivalent continuous A-weighted sound pressure level, in decibels" and is defined in British Standard BS 7445 [1] as the " value of the A-weighted sound pressure level of a continuous, steady sound that, within a specified time internal, T, has the same mean square sound pressure as a sound under consideration whose level varies with time".

It is a unit commonly used to describe construction noise and noise from industrial premises and is the most suitable unit for the description of other forms of environmental noise. In more straightforward terms, it is a measure of energy within the varying noise.

APPENDIX B: Noise Survey Results




Location 2, Buzz Bingo, Banbury
Noise Survey
19th to 26th October 2021
LAeq
LAmax
LA90
Sound Pressure Level (dB)
110
100
90
80
70
60
50
40
30
20
10
0
19/10/21 00:00
20/10/21 00:00
21/10/21 00:00
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Date and Time