

ACOUSTIC DESIGN TECHNOLOGY
Noise and Vibration Consultants

ADT 3350

26 May 2022

Charterpoint (LE67) Ltd
7 Wheatcroft Business Park
Landmere Lane
Edwalton
NOTTINGHAM
NG12 4DG

LAND AT LEICESTER ROAD, MARKFIELD

PRELIMINARY ENVIRONMENTAL NOISE IMPACT ASSESSMENT

ACOUSTIC CONSULTANCY REPORT ADT 3350/ENIA

Revision	Date	Issued By	Checked by	Revision Notes
-	17 May 2022	Chris Middleton	-	first issue
A	26 May 2022	Chris Middleton	-	address updated

TABLE OF CONTENTS

1.0	ENVIRONMENTAL NOISE IMPACT ASSESSMENT	3
1.1	Introduction	3
1.2	Development Details.....	3
1.3	Predicted Noise Levels	4
1.4	Indoor Ambient Noise Criteria	5
1.5	Indicative Noise Control Measures – Building Envelope	5
1.6	Outdoor Living Areas	7
2.0	CONCLUSIONS	8

1.0 ENVIRONMENTAL NOISE IMPACT ASSESSMENT

1.1 Introduction

The purpose of this report is to assess the impact of traffic noise on the proposed development, by noise predictions using Department of Transport traffic flow data, and with reference to the results of the noise survey undertaken by others at a similar location nearby, as already submitted to the local planning authority. This is to give an indication of the acoustic suitability of the site for the proposed development and high level guidance on the scope of noise control measures likely to be required.

The next step would be to carry out an environmental noise survey on the site, calculate the noise levels incident on the building elevations and prepare a detailed scheme of sound insulation measures.

1.2 Development Details

The site is located immediately alongside the A50 in Markfield, Leicester, around 1.25km east of the M1, and is currently equestrian agricultural land. Leicester Road forms the south-western site boundary.

The A50 runs along the north-eastern boundary of the site, and meets a roundabout some 50 metres away to the south-east.

The proposal is construct a two / three storey residential care home with associated access and landscaping, as shown on the Edmund Williams drawing no. 2153\FS\021.

1.3 Predicted Noise Levels

Based on the latest pre pandemic (2019) Department of Transport traffic flows for the A50, standard traffic speeds, and with reference to the results of the environmental noise survey undertaken by others in support of planning application 21/00787/OUT, the day time $L_{Aeq, 16 \text{ hour}}$ predicted noise levels incident on the proposed building are illustrated on the attached noise map 3350/NM1. The predictions are based on a building height of nominally 7 metres, to accommodate 2 main storeys with some undercroft rooms where the ground falls away to the north-west.

The typical noise levels for the main building elevations are set out in the following table, including night time levels determined from the variance measured by others at the 21/00787/OUT application site:

Location	Predicted $L_{Aeq,T}$ dB	
	Day (07:00 - 23:00)	Night (23:00 - 07:00)
North-east elevation	74	69
South-east elevation	71	66
South-west elevation	58	53
North-west elevation	71	66

It is fairly typical for local authorities to expect a consideration of single event noise levels (L_{Amax}). These are less straightforward to predict from the data available, although it is expected that the L_{Amax} at the most exposed north-east elevation are likely to be at least 85 dB L_{Amax} .

1.4 Indoor Ambient Noise Criteria

Typical indoor ambient noise criteria from the latest and most relevant noise guidance documents used by most local authorities are set out in the following table:

Area	Day time 07:00 – 23:00	Night time 23:00 – 07:00	
	$L_{Aeq, 16 \text{ hour}}$	$L_{Aeq, 16 \text{ hour}}$	L_{Amax}
Living room	35 dB		
Dining room / area	40 dB		
Bedroom	35 dB	30 dB	45 dB
Outdoor living areas	50 – 55 dB		

The $L_{Aeq,T}$ criteria for the day time and night time periods are drawn from the guidance in BS 8233:2014. The L_{Amax} requirement in bedrooms at night is from ProPG: Planning & Noise (2017), and is defined in the document as a typical level not to be exceeded more than 10 times a night.

1.5 Indicative Noise Control Measures – Building Envelope

Based on the predicted incident noise levels defined in Section 1.3 above and the noise criteria in Section 1.4 above, the building envelope would need to be capable of reducing the incident $L_{Aeq,T}$ by 39 dB and the L_{Amax} by 40 dB on the most exposed north-east elevation.

Those noise reductions would require a top performance acoustic double glazed unit (notionally $R_w + C_{tr}$ 40 dB, for example, Pilkington 8.8 ‘Optiphon’ / 16 mm gap / 10.8mm ‘Optiphon’). Frame mounted acoustic trickle vents or wall mounted acoustic air bricks may potentially provide the required sound insulation, although a fully ducted whole house ventilation unit or MVHR would be more reliable.

On the side elevations (south-east and north-west) a high performance window would again be required, while frame mounted acoustic trickle vents should be viable (e.g. the Renson 'Sonoslot Max').

At the more sheltered south-west elevation standard thermal double glazing and standard trickle vents would be sufficient.

In principle the provision of acoustic screening to the A50 boundary could reduce the noise levels incident on the building and thereby reduce the sound insulation performance requirements. However, the benefit depends on the height of the screen and the height of the top floor bedroom windows – unless the screen fully blocks the line of sight, the benefits are marginal at best. For example, a standard 2400mm high solid fence is likely to be overlooked by the 1st floor windows, and certainly by 2nd floor windows if a third floor is added.

Considering an alternative building layout, it would clearly be advantageous to set the building away from the north-east boundary to the A50, with the rear portion of the site given over to car parking. This could reduce the noise levels incident on the north-east elevation by 2 to 3 dB, although high performance acoustic glazing and acoustic ventilation would still be necessary, and it is expected that this would severely compromise the site layout from a functional point of view.

The bedrooms are more sensitive than the living rooms (by a margin of 5 dB), so in principle they should ideally be on the south-west elevation, but it is difficult to see this working as a viable layout, and it would be acoustically desirable to have the main shared lounges opening out onto the acoustically sheltered garden on the south-west side.

It should also be noted that the noise criteria in Section 1.4 above are only achievable with windows closed, i.e. with trickle vents or MVHR providing the Approved Document F 'whole dwelling ventilation'. This is fairly normal in most urban areas, and there is justification in ProPG: Planning & Noise, provided that the control of overheating is considered – in other words, that there is reasonable protection against overheating without recourse to opening windows.

1.6 Outdoor Living Areas

It is unlikely that there will be any significant areas of the site where the BS 8233 recommended noise levels for outdoor amenity areas of 50 – 55 dB $L_{Aeq, 16 \text{ hour}}$ can be achieved even with acoustic screening. However, the standard does note that:

...it is also recognized that these guideline values are not achievable in all circumstances where development might be desirable. In higher noise areas, such as city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces, but should not be prohibited.

In other words, the benefits of having outdoor amenity areas outweigh the need for an ideal acoustic environment in those areas, and the advice is to control the noise levels as much as practicable.

For this development the best outdoor amenity area will clearly be the gardens on the south-west side, sheltered from the A50 by the building, where noise levels of 55 – 60 dB $L_{Aeq, 16 \text{ hour}}$ should be achievable, close to the BS 8233 recommended range.

In the more extensive gardens the noise levels will be determined by the north-eastern boundary treatment. Realistically this would be limited to a 2400mm solid timber fence, sufficient to reduce the incident traffic noise levels of above 70 dB $L_{Aeq, 16 \text{ hour}}$ down to within the range 60 – 65 dB $L_{Aeq, 16 \text{ hour}}$ generally.

For this to be effective, the fence boards would need to be reasonably substantial – 22mm timber planks rather than basic feather edge boards – and with no gaps. An indicative acoustic fence design is shown on the attached sketch 3350/SK1.

2.0 CONCLUSIONS

The preliminary noise modelling indicates significant noise levels incident on the north-east elevation, requiring top performance acoustic glazing and probably a WHV or MVHR ventilation system. The side elevations would also require acoustic glazing, but could have frame mounted acoustic vents.

The south-west elevation can have standard thermal double glazing and standard vents.

Re-orientation of the building may slightly reduce the sound insulation requirements but the benefits will be relatively small. Changing the internal layout is not expected to significantly affect the package of sound insulation measures.

Acoustic screening is unlikely to significantly reduce the noise levels incident on the building, although this could improve the noise climate in the extensive garden areas.

FOR ACOUSTIC DESIGN TECHNOLOGY



Notes

Description

Preliminary predicted day time noise levels

Project

Land at Leicester road, Markfield

Date

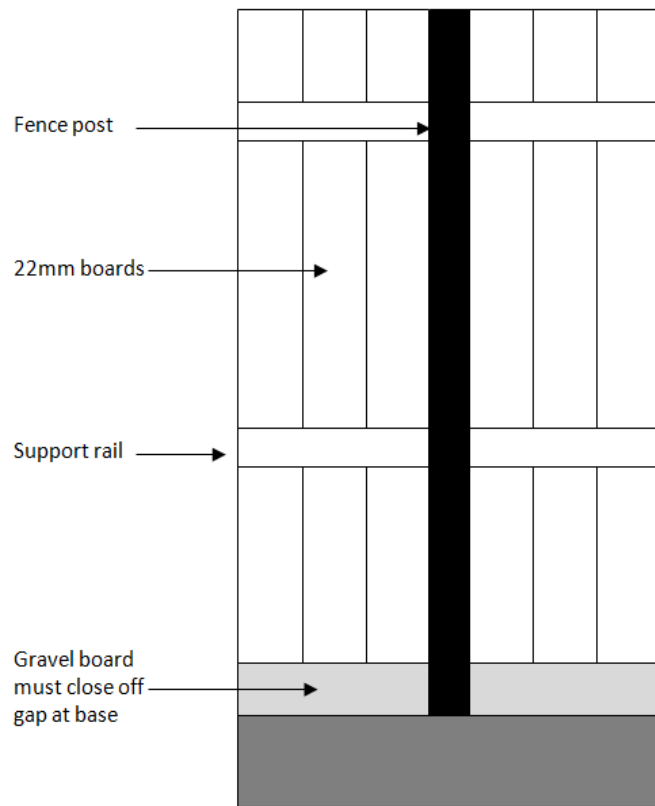
26/05/2022

Drawing No.

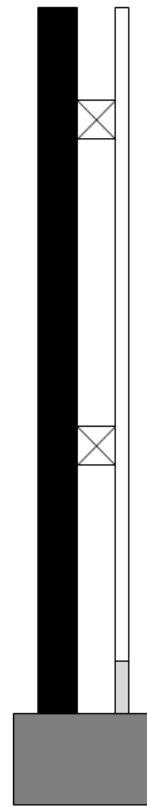
3350/NM1



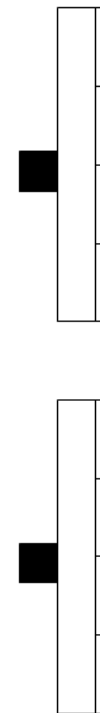
ACOUSTIC DESIGN TECHNOLOGY
Noise and Vibration Consultants



ELEVATION



SECTION



PLAN

T&G boards
do not require
additional
battens

Butt jointed
boards need
battens to
cover the
joints

Notes:-

Nominal sound insulation of
fence is R_w 25

Timber acoustic barrier
indicative details

Drawing no:- ADT 3350/SK1



ACOUSTIC DESIGN TECHNOLOGY
Noise and Vibration Consultants
01246 554841
mail@acousticdesign.co.uk

APPENDIX A

Acoustic Terminology

The annoyance produced by noise is dependent upon many complex interrelated factors such as 'loudness', its frequency (or pitch) and any variations in its level. In order to have some objective measure of the annoyance, scales have been derived to allow for these subjective factors.

A-weighting The human ear is more susceptible to mid-frequency noise than the high and low frequencies. To take account of this when measuring noise, the A-weighting scale is used so that the measured noise corresponds roughly to the overall level of noise that is discerned by the average person. It is also possible to calculate the A-weighted noise level by applying certain corrections to an un-weighted spectrum.

When the noise being measured has variable amplitude, such as traffic noise, it is necessary to qualify the basic dB unit. This may be done using a statistical index L_n dB, where n is any value between 0 and 100, and is the percentage of the sample time for which the stated level is exceeded. In defining the use of the index, both the value of n and the length of the sample period must be stated.

L_{10} L_{10} , being the level exceeded for 10% of the time, has been shown to be a good indicator for traffic noise intrusion, and is used in assessing the effect of traffic noise on residential or commercial premises.

L_{90} L_{90} is the level exceeded for 90% of the time, and is used as a measure of background noise level, as it excludes the effects of occasional transient levels, such as individual passing cars or aircraft.

In addition to the statistical noise indices defined above, the following noise units are also used to define variable amplitude noise sources:

$L_{eq,T}$ $L_{eq,T}$ is defined as the notional steady sound pressure level which, over a stated period of time, would contain the same amount of acoustical energy as the actual fluctuating sound measured over the same period. In other words, it is a measure of the "average" noise level

L_{max} L_{max} is the maximum time-weighted sound pressure level recorded over the stated time period