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NOISE IMPACT ASSESSMENT

at

PROPOSED EXTENSION TO LICENSED PREMISES, HORSE & JOCKEY PUBLIC HOUSE, CHORLTON GREEN, MANCHESTER.

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1.0 **Summary and Conclusions**

An application is being submitted to extend the floor area of the Horse & Jockey public house at Chorlton Green, Manchester. The Local Planning Authority has called for a survey and report on the noise impact on occupants of the nearest dwellings if the development is approved. This report predicts the outdoor sound levels at the dwellings from the proposed development and compares the predictions against the background sound levels measured at night when the premises will be open.

1.1 Sound from the proposed extension to the public house is predicted to cause outdoor sound levels of 34 dB LA_{eq} at the nearest dwelling to the rear of the premises and 28 dB LA_{eq} at the nearest dwelling to the front. These predicted values allow for access doors to the extension in the elevation facing Beech Road to be open.

1.2 The existing background levels were measured at 47 and 40 dB LA_{90} respectively at night. The overall dBA levels with doors open are thereby predicted 12-13 dBA below the night-time background.

1.3 A similar analysis of the sound levels at bass music frequencies predicts that they will be 16 to 26 dB below the night background at the nearest dwellings.

1.4 The usual guidance on music levels is that at noise-sensitive properties they should not exceed the background sound levels as overall dBA levels or at the low frequencies of bass music. The sound from these premises is thereby predicted to comply with this guidance by a substantial margin. If the outer doors to the extension are closed then the sound levels from the premises will comply with the requirement by an even greater margin.

1.5 If mechanical plant items are to be located at the kitchen / services building at the rear of the premises they will need to be selected on the basis of their sound output and may need attenuators. The background sound levels measured in this survey can be used as a basis for their specification.

2.0 Acceptance Standards on Noise

2.1 Good Practice Guide

The most direct guidance for noise criteria from licensed premises is quantified in the 'Good Practice Guide on the Control of Noise from Pubs and Clubs, March 2003'. The document has been widely discussed and accepted and is regarded by many Local Authorities as their main acceptance standard. It suggests:

"For premises where entertainment takes place on a regular basis, music and associated sources should not be audible inside noise-sensitive property at any time."

2.2 Music Sound Levels

Annex A2.3 of the Good Practice Guide quantifies the sound levels which should be applied at venues where entertainment takes place more than once per week or continues beyond 2300 hours. The following criteria apply for both outdoor and interior assessments at noise-sensitive properties:

> "The LA_{eq} of the entertainment noise should not exceed the representative background noise level LA_{90} (without entertainment noise), and
>
> The L_{10} of the entertainment noise should not exceed the representative background noise level L_{90} (without entertainment noise) in any 1/3rd octave band between 40 Hz and 160 Hz."

By adopting these requirements the Good Practice Guide makes two comparisons between the sound levels of music and background:

- Firstly it examines overall dBA sound levels with no analysis of their sound frequencies. The time-averaged level of the music (LA_{eq}) is not to exceed the background (LA_{90}).

- Secondly it makes detailed requirements in the low frequency region of bass music between 40 Hz and 160 Hz. These two musical octaves are divided into seven bands for analysis. The more emphasised music level of L_{10} is not to exceed the background L_{90}.

3.0 Sound From Proposed Development

3.1 Sound Sources

The extension to the public house will consist of a new building linking the existing licensed premises to existing outbuildings at the rear and providing new seated areas for dining on the ground and first floors. The front entrance to the premises will remain as now, ie. existing doors across a lobby off Chorlton Green, and a new entrance to the extension will be provided off Beech Road. The bar will remain on the ground floor, there will be no additional bar as part of the development. Recorded music will be played a background feature only, there will be no dance floor or DJ. Within the new extension the music levels will be sufficiently low that conversation will be possible without raised voices, since the areas are intended for dining only.

The front elevation of the public house onto Chorlton Green will be unaltered by the extension, incorporating the front entrance door and windows to the bars exactly as in its current form. The rear elevation will remain as now consisting of unbroken masonry facing a narrow pedestrian passageway, with the exception of an emergency escape door. The side elevation onto Beech Road is currently a private entrance to the rear of the public house and its outbuildings. This will become a public entrance to the new extension

3.2 Sound Paths to Dwellings

Dwellings are located:

1. On Chorlton Green directly adjacent to the front/ west corner of the public house.

2. On Whitelow Road diagonally opposite the front elevation of the public house, ie. facing Chorlton Green.

3. On Whitelow Road adjacent to the pedestrian passage at the rear of the public house.

The dwellings (1) on Chorlton Green will be unaffected by the extension. The sound which they will receive from the premises will remain as now, ie. from the existing bar through the front entrance and windows, and from customers outdoors at the tables facing Chorlton Green. These dwellings are completely shielded from any direct or indirect sound path from the new extension.

Dwellings (2) on the part of Whitelow Road facing Chorlton Green will continue to receive sound as now from the existing bar through the front entrance and windows, and from customers outdoors at the tables facing Chorlton Green. Although these dwellings will be shielded from a direct view of the new extension there will be an indirect sound path to them through the glazing and new entrance onto Beech Road, after reflection off other buildings or refraction around the edges of buildings.

Dwellings (3) on Whitelow Road adjacent to the pedestrian passage at the rear of the public house will receive sound from the new extension through the sound insulation of its unbroken masonry rear wall, through the roof of the new extension, and through the glazing and new entrance onto Beech Road after reflection off other buildings or refraction around the edges of buildings as described above.

There are no dwellings which will have a direct view of the new extension since its only external elevation faces the end of Beech Road where all buildings are commercial premises and other public houses.

3.3 Sound Levels Inside Premises

The sound levels inside the existing bar of the premises were very low during our visit on Thursday evening 2nd April 2009, being provided by a small number of customers and low background music. Although there is no intention to play music in the new extension other than to provide a background feature for dining and conversation, there is a possibility in any bar/restaurant that a crowded interior may result in sound levels higher than were experienced at these premises during our visit. As a starting point for sound predictions, we use in this report the results of measurements taken recently on a Saturday evening inside a crowded and lively bar/restaurant in Leeds city centre. The sound level from conversation and background music was 78 dB LA_{eq} which was considered as high as is likely or acceptable for an interior intended primarily for dining.

Full frequency spectrum

Sound pressure levels dB linear, Leq:

Frequency (Hz)	63	125	250	500	1k	2k	4k	8k
Inside restaurant	67	69	70	76	74	70	66	57

Bass Music

Sound pressure levels dB linear, L10:

Frequency (Hz)	40	50	63	80	100	125	160
Inside restaurant	63	64	64	65	66	66	66

4.0 **Sound Predictions at Dwellings**

4.1 **Method**

(a) The sound levels at dwellings are predicted from the interior levels measured at other premises as quantified in 3.3.

(b) Outdoor sound levels are calculated taking into account the sound insulation of the elevation facing Beech Road which will provide the primary sound path to the dwellings. The elevation will consist of a glazed curtain wall at both floors with glazed doors which are assumed to be open. The doors lead to an entrance lobby with a corridor to the ground floor bar/restaurant and staircase to the first floor restaurant. No second set of doors is proposed between the lobby and the interior and so the sound decay is estimated along the length of the carpeted corridor from the dining areas to the open doors. The formulae are:

Outdoors-to-indoors:

$$SPL_{outdoors} = SPL_{indoors} - R - 6 \quad dB$$

Distance calculation:

$$SPL_1 - SPL_2 = 10 \log (r_2/r_1) \quad dB$$

for distances from 2m to 3m towards Beech Road where the elevation acts as a line source,

$$SPL_2 - SPL_3 = 20 \log (r_3/r_2) \quad dB$$

for distances greater than 3m where the elevation is a point source.

$SPL_{1,2\&3}$ are sound pressure levels at distances $r_{1,2\&3}$ from the elevation and R is its average sound reduction index. As a starting point for estimation the glazing is taken as being two panes of 6.8mm laminated glass separated by a 16mm airgap.

Sound reduction indices dB:

Frequency (Hz)	**63**	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**
Glazing 6.8/16/6.8	19	23	26	35	43	48	55	59
Open door + glass	8	9	10	10	10	10	10	10

4.2 Dwellings at Rear of Premises

The dominant path by which sound will reach the dwellings in Whitelow Road at the rear of the premises will be through the glazed curtain wall then across the outdoor distance of 15m to the nearest dwelling, after refraction around and over the existing building which will form the kitchen of the public house. The calculations below show predictions for interior sound transmtted through the fixed glazing of the extension.

Overall sound through glazing

Sound pressure levels dB linear, Leq:

Frequency (Hz)	63	125	250	500	1k	2k	4k	8k
Inside premises	67	69	70	76	74	70	66	57
Glazing loss	25	29	32	41	49	54	61	65
Outdoors at 2m	42	40	38	35	25	16	5	0
Distance loss	16	16	16	16	16	16	16	16
Shadow loss	3	4	5	6	6	6	6	6
At rear dwelling	23	20	17	13	3	0	0	0

The overall outdoor sound level of the above spectrum is **13 dB LA_{eq}**

Bass music through glazing

The same calculation as above for the measured levels of bass music inside the other premises and quantified in 3.3 predicts the following:

Sound pressure levels dB linear, L10:

Frequency (Hz)	40	50	63	80	100	125	160
At rear dwelling	20	20	20	19	18	17	16

4.3 Dwellings at Front of Premises

The only dwellings at the front of the public house which may be affected by sound from the extension are those on the part of Whitelow Road which faces Chorlton Green. The dominant path by which sound will reach these dwellings is exactly as described in 4.2 except in the opposite direction along Whitelow Road across the outdoor distance of 30m to the nearest dwelling, after refraction around and over the unoccupied commercial building which was pre viously a fish and chip shop. The calculation steps are as shown in 4.2 but with a distance decay 6 dB greater. The overall sound level outdoors at the dwellings will be **7 dB LA_{eq}** with a bass music spectrum of:

Sound pressure levels dB linear, L10:

Frequency (Hz)	40	50	63	80	100	125	160
At front dwelling	14	14	14	13	12	11	10

4.4 Sound Through Open Doors

Sound from the existing bar area will have a path through the new extension via a carpeted corridor of length 6m and width 2.5m to the outer pair of doors facing Beech Road. The decay of sound along the corridor is assumed to be the same as in semi-reverberant space since one surface, the floor, will be covered with a sound absorber. The indoor-to-outdoor loss at the open doors assumes that their sound reduction index is 0 dB giving a loss of 6 dB from outdoor dispersion (equation of 4.1(b)). The open doors will act as a point source of sound giving a greater distance decay than predicted in 4.2 for the glazed elevation. The sound predictions at the nearest dwelling to the rear of the premises are:

Overall sound through open doors

Sound pressure levels dB linear, Leq:

Frequency (Hz)	63	125	250	500	1k	2k	4k	8k
At bar	67	69	70	76	74	70	66	57
Corridor loss	8	8	8	8	8	8	8	8
Elevation loss	6	6	6	6	6	6	6	6
Outdoors at 1m	53	55	56	62	60	56	52	43
Distance loss	24	24	24	24	24	24	24	24
Shadow loss	3	4	5	6	6	6	6	6
At rear dwelling	26	27	27	32	30	26	22	13

The overall outdoor sound level of the above spectrum is **34 dB LA_{eq}**

Bass music through open doors

The same calculation as above for the measured levels of bass music inside the other premises and quantified in 3.3 predicts the following:

Sound pressure levels dB linear, L10:

Frequency (Hz)	40	50	63	80	100	125	160
At rear dwelling	22	23	23	23	24	24	24

The predicted sound levels at the nearest dwellings at the front of the public house, caused by open doors, are 6 dB lower than those shown above, ie. **28 dB LA_{eq}** with a bass music spectrum of:

Sound pressure levels dB linear, L10:

Frequency (Hz)	40	50	63	80	100	125	160
At front dwelling	16	17	17	17	18	18	18

5.0 Assessments for Planning Purposes

The Good Practice Guide calls for a comparison between the predicted sound levels as shown in 4.2 to 4.4 and the existing background levels.

5.1 Background Sound Measurements

Background sound levels were measured as part of this survey at night outdoors at the nearest dwellings in Whitelow Road at the front and rear of the premises. Measurements were taken between 23.30 hours and midnight during the night of 2nd April 2009. Conditions were dry with no wind, being suitable for outdoor sound readings. All results were taken using a Bruel & Kjaer precision sound level meter type 2260.

The overall LA_{90} results were 47.2 dBA at the rear (position at end of Passage No.1) and 40.4 dBA at the front (No.21 Whitelow Road) consisting of the following frequency spectra:

Sound pressure levels, dB linear, L90

Frequency (Hz)	**40**	**50**	**63**	**80**	**100**	**125**	**160**
Dwelling at rear	48	48	46	43	46	41	40
Dwelling at front	42	43	39	38	44	36	34

The background sound levels were being provided by distant road traffic, and at the dwelling to the rear of the premises also by an extraction fan at The Beech public house which operated continuously. The background measurements were paused when road traffic passed near to the microphone otherwise the results would have been dominated by vehicles in the immediate vicinity.

5.2 Good Practice Guide Comparison

Comparison of the predicted sound levels through open doors with the measured background levels shows the following overall dBA values:

Location	**Premises LA_{eq}**	**Background LA_{90}**	**Comparison v. Background**
Dwelling at rear	34 dBA	47 dBA	13 dBA below
Dwelling at front	28 dBA	40 dBA	12 dBA below

The sound caused by the development should not exceed the background levels when expressed as an overall dBA value and also when analysed into the individual sound frequencies of bass music. The comparisons at low frequencies are shown below as + quantities for exceedances above background and - quantities below background:

Frequency (Hz)	40	50	63	80	100	125	160
Dwelling at rear	-26	-25	-23	-20	-22	-17	-16
Dwelling at front	-26	-26	-22	-21	-26	-18	-16

It is predicted that sound from inside the new extension as received outdoors at the nearest dwellings will be 12 to 13 dBA below the night background sound levels as overall dBA values and 16 to 26 dB below at the low frequencies of bass music. These values are calculated for the worst-case situation in which both of the outer doors to the new extension are open. When the doors are closed and the sound insulation of the glazed curtain wall can be effective then the outdoor sound levels at dwellings are predicted significantly lower (ie. better).

6.0 **Sound from Mechanical Plant Items**

The specifications and location of mechanical plant items associated with the extension have not been determined at this stage. It is expected that there will be an extraction system with an outdoor termination at the kitchen to be located inside the existing building at the rear of the premises. Since sound predictions cannot be made for plant items at this stage, the results of this survey can be used to provide specifications for the outdoor sound generated by plant items.

Guidance to local authorities on the considerations of noise affecting dwellings was issued in 1994 as Planning Policy Guidance 24: 'Planning and Noise'. Paragraph 19 of Annex 3 deals specifically with noise from industrial or commercial developments near to existing dwellings. The basic assessment method called for is a complaints rating to BS 4142, and it is this Standard that would usually be applied to sound sources such as plant items.

The method of BS 4142 compares the outdoor sound level from the commercial sources as received at dwellings against the background sound level. Overall dB LA_{eq} values are used with no sound frequency analysis, but a correction of 5 dBA must be added to the sound level of the source if it contains certain features which affect its acceptability. An

extraction fan may contain a tonal element of sound which would attract the 5 dBA correction. BS 4142 concludes that where the rating level, ie. the plant sound level plus the correction factor, is 10 dB or more below the background then this is a ‘positive indication that complaints are unlikely’. On this basis LPAs usually demand that the rating level of mechanical plant items is 5 dB or 10 dB lower than the background sound level.

The background level at the dwelling nearest to the kitchen building was measured at 47 dB LA_{90} at night. It is suggested that suppliers of mechanical plant items should be prepared for the acceptance criteria on the outdoor sound levels of their equipment to be around 37-42 dB LA_{eq} at the nearest dwelling pending a decision from the LPA.

The nearest dwelling is separated from the kitchen building by the narrow pedestrian passageway only, so that the distance from the outdoor termination of the kitchen extraction system to windows of the dwelling may be only a few metres, depending on its location. The outdoor decay of sound will be, for example, 14 dBA over a distance of 5m and 20 dBA over a distance of 10m. The corresponding range of anticipated sound limits at 1m from the fan termination would be 51-56 dBA if it is spaced 5m from the nearest dwelling window and 57-62 dBA if it is spaced 10m away. These values emphasise the advantage of locating mechanical plant as far away as possible from the dwelling, if possible with no direct sightline from them to the dwelling windows, also the likelihood of attenuators being necessary at outdoor fans or fan terminations.

It is concluded that it will be technically possible to locate mechanical plant items at the kitchen / services building at the rear of the premises, within the usual noise acceptance criteria, but they will need selection on the basis of their sound output and may need attenuators.
