

NOISE IMPACT ASSESSMENT REPORT

PROPOSED PUB AND BEER GARDEN ALTERATIONS, THORNBERRIES PUB, MIDDLETON, M24 1LW

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This report has been prepared based upon a scope of works and associated resources agreed between the client and Philip Dunbavin Acoustics Ltd (PDA). This report has been prepared with all reasonable skill, care and diligence and has been based upon the interpretation of data collected. This has been accepted in good faith as being accurate and valid at the time of the collection. This report has been based solely on the specific design assumptions and criteria stated herein.



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1.0 SUMMARY

At the request of Joseph Holt Ltd a noise impact assessment has been undertaken for the proposed alterations of the Thornberries pub located at 179A Kirkway in Middleton, M24 1LW.

A noise survey has been conducted at positions representative of the nearest noise sensitive dwellings to the existing pub and beer gardens. The results of the survey have been used to establish the existing ambient and background noise climates at the nearest noise sensitive receptors during the likely quietest periods of the proposed opening times of the pub/beer garden.

Utilising data of the likely noise levels generated by the proposed beer garden areas we have calculated the expected noise levels at the nearest noise sensitive receivers. The results of our calculations have indicated that the noise level incident upon the most noise sensitive residential property to be 50 dB L_{Aeq} during the opening hours of the pub. The assessment indicates that the overall noise egress from the likely noise sources associated with the proposed changes to the site are level to or below the existing measured ambient noise climate at the nearest noise sensitive receivers given in Tables 4, 5 and 6 above. As such this is an indication that the proposed development falls within the lowest observed adverse effect level and would have a low impact on the surrounding residential receivers, and is therefore in accordance with the National Planning Policy Framework. Additional receivers that are further away would experience lesser impacts

In addition it is noted that the highest calculated absolute noise levels are below the BS8233:2014 and WHO Guidelines for Community Noise suggested external noise levels of 50 – 55 dB(A) outside dwellings during the daytime.

It is understood there will be no additional fixed plant installed due to the proposed alterations however the noise survey has also been used to benchmark existing background noise levels at the buildings representative of nearby noise sensitive receivers. These levels have been used to specify plant noise limits in line with BS4142 good practice criteria if any additional fixed plant is to be installed.

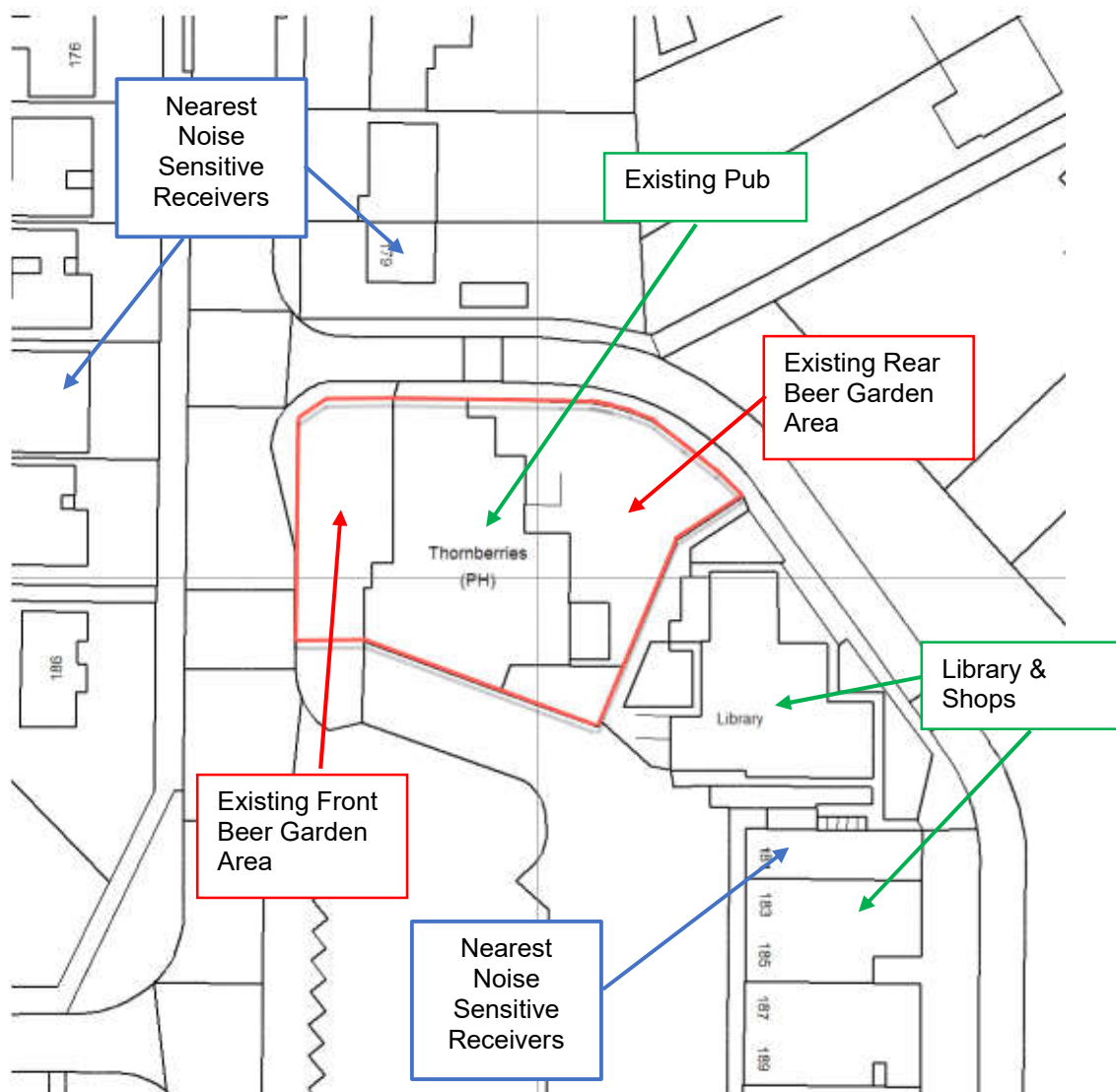
2.0 INTRODUCTION

The proposals are for a front elevation extension to the public house introducing a new external terrace, adding a new side beer garden, changes to the rear beer garden and altering the internal layout of the bar lounges and kitchen. It is understood that the existing opening hours are between 14:00 to 23:00 hours Monday to Thursday, 12:00 to 00:00 hours Friday and Saturday and 12:00 to 23:00 hours on Sunday.

The existing pub is located at 179A Kirkway in Middleton. The local area is a combination of residential and commercial premises. Directly to the south of the pub is a library and a number of shops with associated car park. The shops include cafes, convenience stores, bookmakers, butchers etc.. The nearest residential receivers have been identified as the dwellings located directly opposite the front façade of the pub on Kirkway, the dwelling to the north on Kirkway and the dwellings above the shop premises to the south east of the pub. It is noted that the pub has an existing beer garden to the front of the premises and one also to the rear of the pub which includes a smoking shelter.

A site plan showing the location of the site and the surrounding local area including the closest residential receivers is shown in Figure 1 below.

Figure 1. Site Location (in red) with Nearest Residential Receivers



3.0 NOISE ASSESSMENT CRITERIA

3.1 National Planning Policy Framework (NPPF)

National Planning Policy is guided by the National Planning Policy Framework (NPPF) updated in July 2021. With regard to Noise the Framework states the following;

Planning policies and decisions should contribute to and enhance the natural and local environment by:

- *preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability.*

Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:

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

The terms 'significant adverse impact' and 'adverse impact' are defined in the explanatory notes of the 'Noise Policy Statement for England (NPSE)' which states;

There are two established concepts from toxicology that are currently being applied to noise impacts, for example, by the World Health Organisation. They are:

NOEL – No Observed Effect Level

This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise.

LOAEL – Lowest Observed Adverse Effect Level

This is the level above which adverse effects on health and quality of life can be detected.

Extending these concepts for the purpose of this NPSE leads to the concept of a significant observed adverse effect level.

SOAEL – Significant Observed Adverse Effect Level

This is the level above which significant adverse effects on health and quality of life occur.

The notes also offer an explanation of the term 'other adverse impacts' as follows;

... refers to the situation where the impact lies somewhere between LOAEL and SOAEL. It requires that all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life while also taking into account the guiding principles of sustainable development (paragraph 1.8). This does not mean that such adverse effects cannot occur.

It should be noted that no specific noise limits for LOAEL and SOAEL have yet been specifically defined; however guidance from other acoustic standards may be employed to determine suitable levels within the overall principal of the National Planning Policy Framework.

3.2 Planning Practice Guidance – Noise

The UK Planning Practice Guidance on noise offers further guidance on the typical levels which constitute the NOEL, LOAEL and SOAEL and is reproduced in the table below;

Table 1. Planning Practice Noise Level Guidance

Response	Examples of Outcomes	Increasing Effect Level	Action
Not present	No Effect	No Observed Effect	No specific measures required
No Observed Adverse Effect Level			
Present and not intrusive	Noise can be heard, but does not cause any change in behaviour, attitude or other physiological response. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.	No Observed Adverse Effect	No specific measures required
Lowest Observed Adverse Effect Level			
Present and intrusive	Noise can be heard and causes small changes in behaviour, attitude or other physiological response, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a small actual or perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level			
Present and disruptive	The noise causes a material change in behaviour, attitude or other physiological response, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid
Present and very disruptive	Extensive and regular changes in behaviour, attitude or other physiological response and/or an inability to mitigate effect of noise leading to psychological stress, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory	Unacceptable Adverse Effect	Prevent

It is notable from the above planning guidance that development should not normally be permitted above Significant Observed Adverse Effect Levels, and should aim to minimise Other Adverse Effect Levels (below SOAEL but above LOAEL). However, it is clear that noise is permitted to approach and/or exceed the Lowest Observed Adverse Effect Level, providing that noise is mitigated and reduced to a minimum.

3.3 BS8233:2014 Guidance on Sound Insulation and Noise Reduction for Buildings

British Standard 8233:2014, *Guidance on Sound Insulation and noise reduction for buildings*, gives guidance on internal noise levels within dwellings, flats and rooms in residential use when unoccupied. The following criteria are for Living and Dining Rooms for daytime use and Bedrooms for night time.

Table 2. BS8233 recommended indoor ambient noise levels

Activity	Location	07:00 to 23:00	23:00 to 07:00
Resting	Living room	35 L _{Aeq,16hour}	–
Dining	Dining room/area	40 L _{Aeq,16hour}	–
Sleeping (daytime resting)	Bedrooms	35 L _{Aeq,16hour}	30 L _{Aeq,8hour}

It should however be stressed that the above criterion relates to steady noise, in this case from road traffic etc., excluding unusual noise events departing from the typical noise character of the area.

3.4 WHO Guidelines for Community Noise

In 1999, the WHO (World Health Organisation) published Guidelines for Community Noise, stating the following internal noise levels are applicable to dwellings.

Table 3. WHO Guidelines for Community Noise criteria

Specific Environment	Critical Health Effect(s)	L _{Aeq} dB	Time Base (hours)*
Outdoor living area	Serious annoyance, daytime and evening	55	16
	Moderate annoyance, daytime and evening	50	16
Outside Bedrooms	Sleep disturbance, window open (outdoor values) night time	45	8

* Typically taken to be daytime/evening - 07:00 – 23:00 hours, and night time 23:00 – 07:00 hours.

WHO guidelines state, 'To protect the majority of people from being seriously annoyed during the daytime, the outdoor sound level from steady, continuous noise should not exceed 55 dB L_{Aeq} on balconies, terraces and in outdoor living areas. To protect the majority of people from being moderately annoyed during the daytime, the outdoor sound level should not exceed 50 dB L_{Aeq}.'

4.0 AMBIENT NOISE SURVEY DETAILS

4.1 Survey Times and Dates

The ambient noise measurements were conducted between 20:15 and 23:45 hours on Wednesday 10th January 2024, with all measurements being made and fully attended by Mr L Kavaney of PDA Ltd. The measurement periods were selected to capture the likely quietest periods of the proposed opening times of the pub/beer gardens.

4.2 Equipment Used

Throughout the survey measurements were undertaken with a NTi XL2 sound level meter and a Rion NA-28 sound level meter. The meters are precision grade Class 1 sound level meters (as per BS EN 61672-1: 2002) for which current calibration certificates are held. The meters were set to A-Weighted and fast response. The meters were calibrated directly before any measurement took place and immediately afterwards and no significant drift was observed.

4.3 Weather

The weather during the noise survey was dry, with negligible wind speeds, temperatures ranged between 5 – 6 degrees centigrade, with cloud cover mostly 100%. The weather was considered conducive to undertaking noise measurements.

4.4 Measurement Positions & Procedure

Measurements were undertaken at three positions at the site. The positions may be considered representative of the ambient and background noise levels at the closest residential locations to the site. A range of statistical noise indicators was measured, including L_{Aeq} and L_{A90} . Measurements were setup to log every 15-minutes. The positions are described below.

- Position 1 – microphone located on a pole approximately 2.2m above ground level located adjacent to the garden/drive of 179 Kirkway to the side of the pub.
- Position 2 – Sound level meter located on a tripod approximately 1.5m above ground level located on the pedestrian area of land to adjacent to the dwellings above the shops to the rear of the pub.
- Position 3 – Sound level meter located on a tripod approximately 1.5m above ground level located on Kirkway to the front of the pub.

It is noted that the microphone of the sound level meters at all positions are assumed to be a free field measurements. The measurement locations are highlighted within the following figure:

Figure 2. Measurement Locations



4.5 Measured Results

A summary of the noise level measurements is given below. The levels are presented in terms of L_{Aeq} and L_{A90} in the tables and have been rounded to the nearest decibel.

Table 4. Summary of environmental noise measurements at Position 1

Time Period (hh:mm)	$L_{Aeq,T}$ (dB)	$L_{A90,15mins}$ (dB)
20:15	55	45
20:30	57	45
20:45	53	45
21:00	51	44
21:15	53	43
21:30	52	43
21:45	58	43
22:00	49	42
22:15	51	42
22:30	48	41
22:45	49	41
23:00	52	41
23:15	53	43
23:30	55	47
Average	53	N/A

Table 5. Summary of environmental noise measurements at Position 2

Time Period (hh:mm)	$L_{Aeq,T}$ (dB)	$L_{A90,15mins}$ (dB)
20:45	51	42
21:00	49	46
21:50	49	40
Average	50	N/A

Table 6. Summary of environmental noise measurements at Position 3

Time Period (hh:mm)	$L_{Aeq,T}$ (dB)	$L_{A90,15mins}$ (dB)
21:17	56	42
21:32	56	41
21:47	59	41
22:25	55	40
22:40	53	40
Average	56	N/A

4.6 Description of Noise Sources

Position 1 – Dwellings to the North

Traffic noise on Kirkway and the link road for the rear of the shops was the main noise source at this location. Occasional buses were observed passing through Kirkway. Other contributory noise sources included intermittent noise from fixed plant noise from the pub, occasional noise from patrons smoking externally or leaving the pub, a taxi waiting with engine idling to the side of the pub and distant traffic.

Positions 2 and 3 – Dwellings to the Southeast and West

Traffic noise on Kirkway was the main noise source at this location. Other contributory noise sources included noise from cars and people entering and leaving the car park.

5.0 NOISE IMPACT ASSESSMENT

5.1 External Noise Levels

Drawings indicate the proposals for a front elevation extension to the public house introducing a new external terrace along with adding a new side beer garden. In addition there will be changes to the existing rear beer garden which we understand will likely include additional seating and tables.

As the noise survey and assessment has been undertaken in January the existing beer gardens were not occupied during our visit, and therefore we have undertaken a noise modelling exercise to allow a comparison between the potential noise level of the existing and proposed beer gardens based on the number of tables.

For assessing the existing and proposed seating areas of the beer we have considered data using the Average Speech Levels and Spectra in Various Speaking/Listening Conditions: A Summary of the Pearson, Bennett, & Fidell (1977) Report. For the existing beer gardens we have based the number of tables on the existing drawings and online aerial photographs. For the proposed beer gardens the proposed drawings indicate the number of tables for each beer garden. Therefore within our assessment the proposed front terrace will have 6 additional tables, the new side beer garden will introduce 6 new tables and the rear beer garden will have 8 additional tables.

Based upon this for each table we have assumed 2 no. persons to be speaking simultaneously, both with raised voices using data for a male and female. It is assumed the beer garden areas will be open solely during the daytime opening hours of the pub between between 12:00 hours to 23:00 hours Monday to Sunday.

Details of the following external sound power level used within our calculations are summarised within the following table:

Table 7. External Noise Break-out - Patrons in Beer Garden Areas with Raised Voices

Activity / Plant	A-Weighted Sound Power SWL (dB)	Sound Reduction Index Octave Band Centre Frequencies (Hz) dB							
		63	125	250	500	1k	2k	4k	8k
Outside Seating per table (2 no. persons)	74	-	61	69	73	69	65	60	54

The locations and elevations of the existing and proposed beer gardens, tables, fences etc. are taken from Design 306 Floor Plan & External Elevations drawings no. 2371.001 to 005, dated September 2023, with extracts below.

Figure 3. Existing Beer Gardens Layout

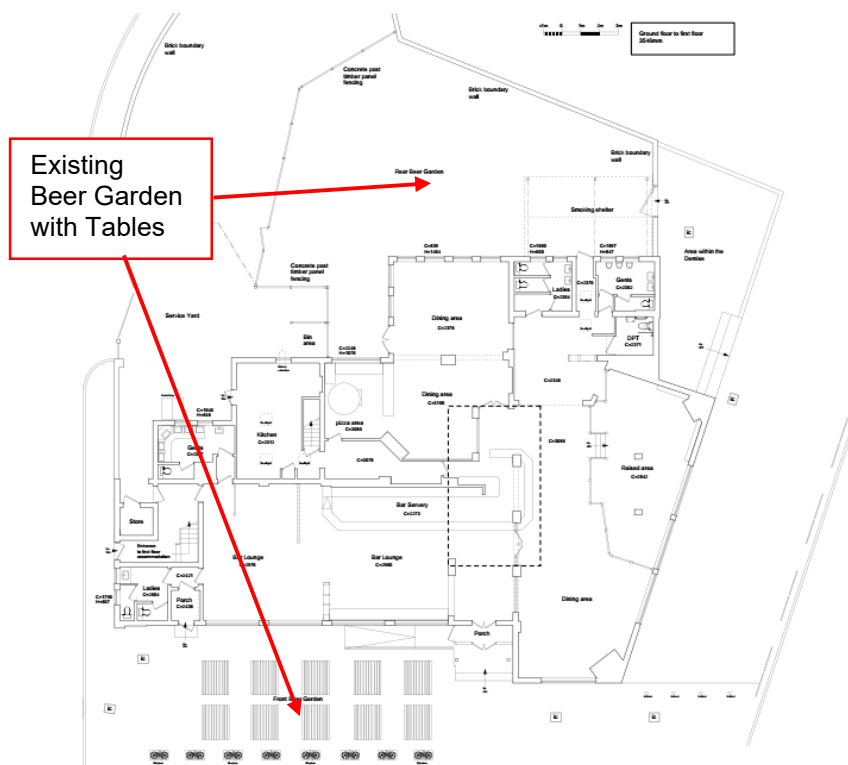


Figure 4. Proposed Beer Gardens Layout



5.2 Noise Propagation Calculations – Existing and Proposed Beer Garden

A 3-dimensional noise model has been created using Soundplan noise modelling software. The software uses the method of ISO 9613 'Acoustics – attenuation of sound during propagation outdoors – general method of calculation' and takes into account geometric spreading, ground effects, air attenuation, barrier attenuation and reflections.

The model is based upon aerial photographs and the supplied proposed site layout plan provided by the Client. A ground absorption coefficient of 0 has been used to correspond with the intervening ground from the site through to the receivers which is predominately hard surfaces (i.e. hard standing, car park, roads, buildings etc).

It should be noted that within the model, the noise source of the patrons on the tables are modelled as point sources. For the tables within the existing beer gardens we have inserted 24 no. point sources (one for each table) which equates to 48 persons speaking simultaneously based on Section 5.1 and have assumed a height of 1m above the floor level for the point sources within the model. For the tables within the proposed beer gardens we have inserted 43 no. point sources (one for each table) which equates to 86 persons speaking simultaneously. The 2m high boundary walls/fences have been included within the model.

For the receivers, noise levels are calculated at 1.5m at ground floor level and an additional 2.8m for each additional storey. For the receiver above the shop the noise levels are calculated at 6m at first floor level and an additional 2.8m for the floor above. Only the highest calculated noise level has been reported in the table below.

The Soundplan model would suggest the following noise levels calculated at the closest noise sensitive receivers for the existing beer gardens layout and the proposed beer gardens layout. For other receivers further away a lower noise level would be experienced due to greater distance attenuation provided. Only the highest calculated noise level has been reported in the table below.

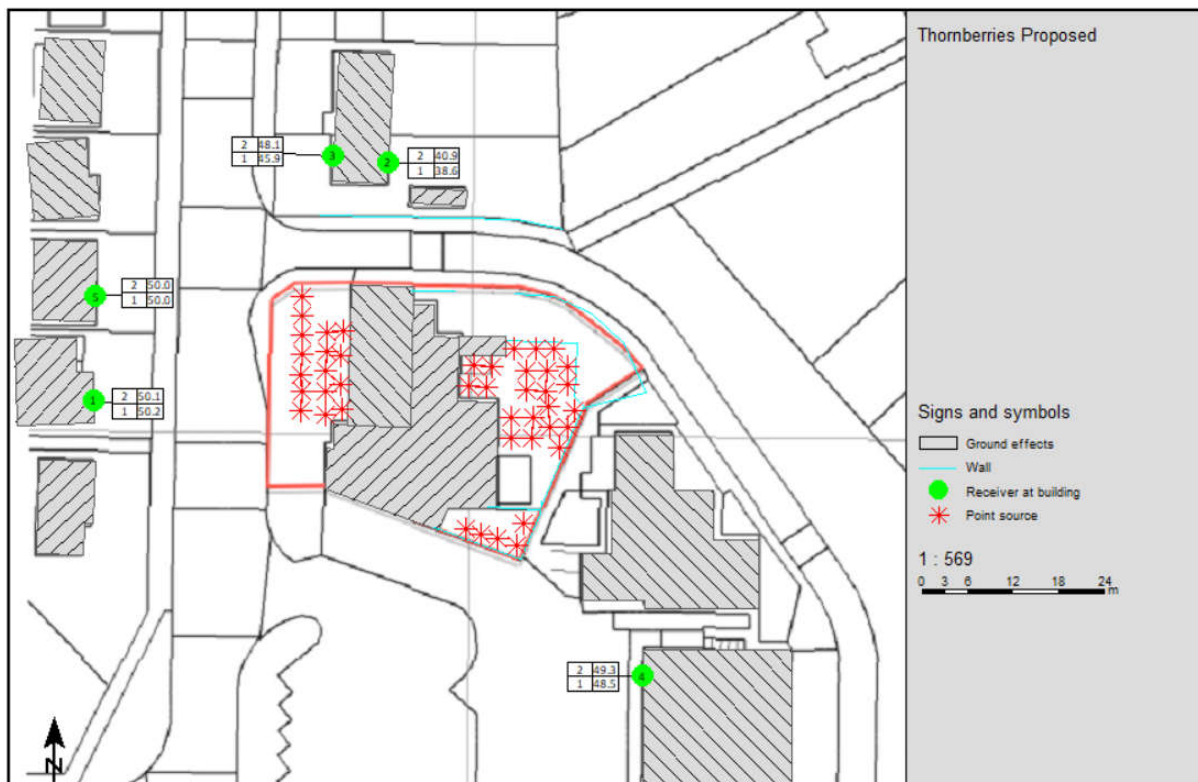
Table 8. Calculated noise levels at the closest receivers – Existing and Proposed Scenarios

Operational Period (hh:mm)	Calculated noise level at Western NSR, dBA	Calculated noise level at Southeast NSRs dBA	Calculated noise level at Northern NSRs, dBA
Existing Daytime opening hours	48 (Receiver 1)	46 (Receiver 4)	43 (Receiver 2)
Proposed Daytime opening hours	50 (Receiver 1)	49 (Receiver 4)	41 (Receiver 6)

Figure 5. Calculated noise levels at residential receivers (Existing Beer Gardens)



Figure 6. Calculated noise levels at residential receivers (Proposed Beer Gardens)



5.3 Noise Impact Assessment – Discussion of Results

Two separate noise models have been created to allow a comparison between the likely existing and proposed beer garden scenarios based upon the received existing and proposed site layout drawings. The results indicate that the predicted noise levels at the nearest residential receivers to the west and southeast have a negligible increase in noise level by 2-3dBA due to the proposed new layouts of the beer gardens with additional tables and additional side beer garden. The results indicate that noise levels at the residential receiver to the north are predicted to marginally reduce due to the additional screening from the proposed kitchen extension and fencing.

Utilising data of the likely noise levels generated by the proposed beer garden areas we have calculated the expected noise levels at the nearest noise sensitive receivers. The results of our calculations have indicated that the noise level incident upon the most noise sensitive residential property to be 50 dB L_{Aeq} during the opening hours of the pub. The assessment indicates that the overall noise egress from the likely noise sources associated with the proposed changes to the site are level to or below the existing measured ambient noise climate at the nearest noise sensitive receivers given in Tables 4, 5 and 6 above. As such this is an indication that the proposed development falls within the lowest observed adverse effect level and would have a low impact on the surrounding residential receivers, and is therefore in accordance with the National Planning Policy Framework. Additional receivers that are further away would experience lesser impacts.

If comparison is made with the predicted specific noise levels described within Section 5.2 and WHO guidance in Section 3.4 it can be seen that the predicted noise from the proposed scheme will be level to or below the 50dB L_{Aeq} WHO guidance criteria for the onset of moderate annoyance during the daytime.

With reference to context, the absolute noise level associated with the changes to the proposed beer garden is level to or below the existing ambient noise climate which comprised of road traffic noise and occasional noise contributions from the pubs patrons and fixed plant from the pub. Further to this it is noted that there are existing beer gardens to the front and rear of the pub along with a smoking shelter and therefore the character of the noise sources associated with the proposed changes to the beer gardens will be similar to existing noise sources which are currently attributed with the existing pub. We would therefore consider that the context described above would also reduce the impact of the scheme.

Within the calculations it has been assumed that all tables within the proposed beer garden are fully occupied and speaking at a raised voice level simultaneously. We would consider that this is a relatively 'worst-case' scenario where the proposed beer garden may change in busyness throughout opening hours and a raised voice level may not always be required for conversation. The impact is therefore likely to be lower than the levels calculated within this assessment.

It is noted that the NPPF requires that significant adverse impacts due to a new development should be avoided and other adverse impact should be mitigated and reduced to a minimum. Based upon the above assessment it is concluded that the sound levels arising from the activities of the proposed development will not result in an adverse impact and will therefore comply with the requirements of the NPPF.

6.0 FIXED PLANT NOISE LIMITS

It is understood there will be no additional fixed plant installed due to the proposed alterations however if any additional fixed plant is deemed necessary we would recommend the following noise limits at the nearest noise sensitive receivers based on the survey results.

6.1 BS4142:2014 Method for Rating and Assessing Industrial and Commercial Sound

The effect of plant noise emissions on the nearest noise sensitive residences can be assessed in accordance with BS4142:2014 – *'Methods for rating and assessing industrial and commercial sound'*.

The standard describes a method of determining the level of a noise of commercial or industrial nature, together with procedures for assessing the impact of such a noise outside nearby noise sensitive areas.

The standard provides a procedure for comparing the noise from commercial sources with background noise levels in the absence of the commercial noise and determining the likely impact of the noise on noise sensitive areas.

In accordance with BS 4142 the background noise level is the typical A-weighted sound pressure level at the assessment position that is exceeded for 90% of a given time interval (L_{A90}). The specific noise level is the equivalent continuous (L_{Aeq}) sound pressure level at the assessment position produced by the noise source over a given time interval.

Certain acoustic features can increase the impact over that expected from a simple comparison between the specific noise level and the background level. Where such features are present, these are considered by adding corrections to the specific noise level.

The corrections are applied based on whether the following features occur, or are expected to be present. The correction values can either be determined subjectively, or by various objective measurement procedures.

- The noise contains a distinguishable, discrete, continuous tone (whine, hiss, screech, hum, etc.). 0 – 6 dB penalty
- The noise contains distinct impulses (bangs, clicks, clatters, or thumps). 0 – 9 dB penalty.
- The noise is irregular enough to attract attention. 0 – 3 dB penalty.
- Other features. 0 – 3 dB penalty.

From the addition of the above penalties where appropriate the rating level is established, this being the value that is compared with the background noise.

According to BS 4142 an initial estimate of the impact is given for a rating level of:

- 10 dB(A) or more above the background is an indication of significant adverse impact, depending on the context.
- 5 dB(A) above the background is an indication of an adverse impact, depending on the context.
- where the rating level does not exceed the background level, this is an indication of the specific sound source having a low impact, depending on the context.

The above initial assessment may then be modified depending on the context to take into account;

- The absolute level of the sound.
- The character and level of the residual sound compared to the character and level of the specific sound.
- The sensitivity of the receptor and whether dwellings or other premises used for residential purposes will already incorporate design measures that secure good internal and/or outdoor acoustic conditions, such as:

1. Façade insulation treatment
2. Ventilation and / or cooling that will reduce the need to have windows open so as to provide rapid or purge ventilation; and
3. Acoustic screening

For this development, potential impacts have been identified as building services plant noise, which are to be located within plantrooms or from externally mounted plant.

It is understood that the building is to be used during daytime and therefore it is assumed that plant may operate at these times. It has not been confirmed whether plant is to operate during the night. Therefore fixed plant noise limits have been considered for both daytime (07:00 – 23:00) hours and night time (23:00 – 07:00) hours.

6.2 Fixed Plant - Proposed Design Criteria (If Required)

If any additional fixed plant is required then noise emission from the development (i.e. mechanical plant) will need to be controlled to achieve acceptable levels of environmental noise in the surrounding areas. Therefore in order to avoid an adverse impact being initially indicated in accordance with BS 4142 (before the consideration of context) the document would recommended that noise egress from plant based sources do not exceed the typical background noise level at the nearest NSR's during the day or night-time periods.

Based upon the noise measurements from the ambient noise survey detailed in Section 4, the noise level limits are detailed in the table below.

Table 9. Limit on noise due to any new plant at the nearest noise-sensitive receivers

Operation Period (hh:mm)	Noise limit at receiver, dBA
Daytime operational plant (07:00 – 23:00)	40
Night time operational plant (23:00 – 07:00)	40

BS4142 guidance would suggest, *'where the rating level does not exceed the background level, this is an indication of the specific sound source having a low impact.'*

Therefore a daytime and night time plant noise limit of 40 dB L_{Aeq} is likely to be suitable when measured at the closest residential receivers, assuming no 'feature correction' is applicable.

If a feature correction is apparent (see Section 6.1), these limits should be reduced in accordance with BS4142 requirements. The requirements of the Local Authority should be checked to ensure that the plant noise egress design meets with their requirements.

7.0 CONCLUSION

At the request of Joseph Holt Ltd a noise impact assessment has been undertaken for the proposed alterations of the Thornberries pub located at 179A Kirkway in Middleton, M24 1LW.

A noise survey has been conducted at positions representative of the nearest noise sensitive dwellings to the existing pub and beer gardens. The results of the survey have been used to establish the existing ambient and background noise climates at the nearest noise sensitive receptors during the likely quietest periods of the proposed opening times of the pub/beer garden.

Utilising data of the likely noise levels generated by the proposed beer garden areas we have calculated the expected noise levels at the nearest noise sensitive receivers. The results of our calculations have indicated that the noise level incident upon the most noise sensitive residential property to be 50 dB L_{Aeq} during the opening hours of the pub. The assessment indicates that the overall noise egress from the likely noise sources associated with the proposed changes to the site are level to or below the existing measured ambient noise climate at the nearest noise sensitive receivers given in Tables 4, 5 and 6 above. As such this is an indication that the proposed development falls within the lowest observed adverse effect level and would have a low impact on the surrounding residential receivers, and is therefore in accordance with the National Planning Policy Framework. Additional receivers that are further away would experience lesser impacts

In addition it is noted that the highest calculated absolute noise levels are below the BS8233:2014 and WHO Guidelines for Community Noise suggested external noise levels of 50 – 55 dB(A) outside dwellings during the daytime.

It is understood there will be no additional fixed plant installed due to the proposed alterations however the noise survey has also been used to benchmark existing background noise levels at the buildings representative of nearby noise sensitive receivers. These levels have been used to specify plant noise limits in line with BS4142 good practice criteria if any additional fixed plant is to be installed.

APPENDIX A – DEFINITION OF ACOUSTIC TERMS

The decibel

This is the basic unit of noise, denoted dB.

A Weighting

This is a weighting process which simulates the human ear's different sensitivity at different frequencies. A weighting can be shown two typical ways, 50 dB(A) L_{eq} or 50 dB L_{Aeq} . Both mean the same thing. (See below for a definition of L_{eq}). The dB(A) level can be regarded as the overall level perceived by human beings.

L_{eq} and $L_{eq(s)}$

This is the equivalent continuous noise level which contains the same acoustic energy as the actual time-varying sound. In other words it is a kind of average noise level. It is denoted dB L_{eq} or, for A-weighted figures dB(A) L_{eq} or dB L_{Aeq} . It can also be expressed in terms of frequency analysis (see later). $L_{eq(s)}$ is the sample L_{eq} level.

L_n

This is the level exceeded for n% of the time. It is denoted dB L_n or, for A-weighted figures dB(A) L_n or dB L_{An} . It can be expressed in terms of frequency analysis (see later). L_{90} is the level exceeded for 90% of the time and is a measure of the lowest level typically reached. L_{10} is the level exceeded for 10% of the time and is the highest level typically reached. L_{50} is the level exceeded for 50% of the time and, mathematically, it is the median.

L_{max}

This is the maximum level reached during a measurement period. The "time constant", or the ability of the equipment to respond to impulses is usually expressed along with it, e.g. "Fast", "Slow", etc. It is denoted dB L_{max} or, for A-weighted figures dB(A) L_{max} , dB L_{Amax} , etc. It can also be expressed in terms of frequency analysis.

Frequency Analysis

Whereas dB(A) gives a very useful overall figure, it has its limitations in that it cannot be used to model or predict the effect of noise control and mitigation as this nearly always has radically different performance at different frequencies.

Frequency analysis expresses an overall noise level at each frequency or band of frequencies in the audible range. Octave band analysis divides the audible range into 10 bands from 31.5 Hz to 16 kHz and the noise level in each band can be expressed in any form e.g. L_{eq} , L_{90} , L_{max} etc. One third octave band analysis uses 30 bands.

Narrow band analysis takes the process to resolutions of less than 1 Hz. This is useful for identifying the existence of tones (whines, hums, etc.) and in pin-pointing the sources.