Martec Environmental Consultants Ltd.
Waterbrow Wood, Gressingham, LANCASTER LA2 8LX
Tel: 01524 222000
Email: info@martecenviro.co.uk
Website: www.martecenviro.co.uk

NOISE ASSESSMENT

Manor House Commercials Ltd

Proposed MOT Garage

Lands End Farm

Hothersall Lane, Preston PR3 2XB

Report Date:	1st November 2022
Ref:	20250502 9774 Hothersall MOT
Site Visit by:	M A Kenyon
Site Visit:	18th October 2022

Prepared by: M A Kenyon MSc BSc MIOA

[redacted]

Checked by: D A B Kenyon BSc CIEH MIOA

[redacted]

Staffordshire / Cheshire Office:
2, Betley Hall Gardens, Betley, Crewe CW3 9BB

ANC | ACOUSTICS & NOISE CONSULTANTS

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1.0 INTRODUCTION

On the instructions of LJG Planning Consultancy, acting on behalf of their clients Manor House Commercials Ltd, Martec Environmental Consultants Ltd carried out a noise assessment of a proposed MOT garage at Lands End Farm, Hothersall Lane, Preston PR3 2XB.

This report considers appropriate assessment criteria, measurements of the existing noise climate, and predictions of the proposed operations on site and draws conclusions as to the acceptability of the proposals.

Acoustic terminology is explained at Appendix 1 of this report, the author's qualifications and experience are described in Appendix 2.

2.0 SITE & OPERATION DESCRIPTION

The site was previously occupied by an agricultural/industrial type building; the footprint of which can be seen in Figure 1. The proposals would see the existing building replaced with an larger industrial unit housing an MOT garage where some vehicle repair work would be conducted as part of the operation [See Figure 2].

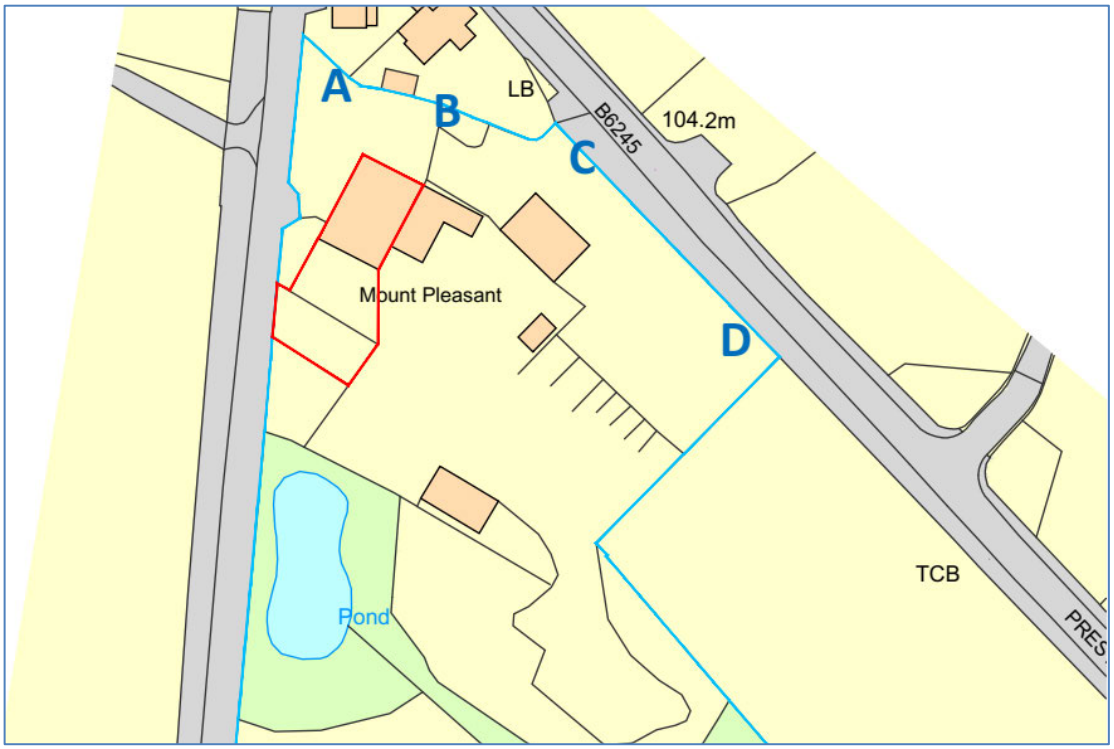

Figure 1: Site Location Plan & Noise Monitoring Positions

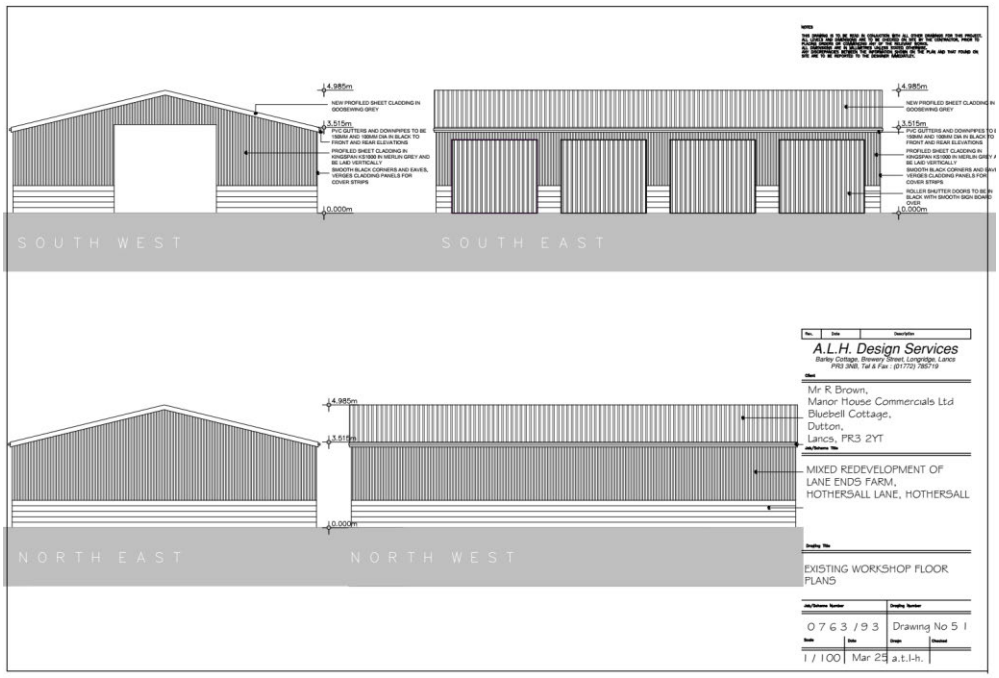

Figure 2: Building Plans - Elevations

3.0 NOISE CRITERIA

3.1 BS4142:2014+A1:2019 - Method for Rating and Assessing Industrial and Commercial Sound

BS4142:2014 states, "*Response to sound can be subjective and is affected by many factors, both acoustic and non-acoustic. The significance of its impact, for example, can depend on such factors as the margin by which a sound exceeds the background sound level, its absolute level, time of day and change in the acoustic environment, as well as local attitudes to the source of the sound and the character of the neighbourhood…This British Standard describes methods for rating and assessing sound of an industrial and/or commercial nature".*

The Standard requires that the ambient noise ***(totally encompassing sound in a given situation at a given time, usually composed of sound from many sources near and far)*** including the "specific" sound from the source in question is measured in terms of the equivalent continuous sound level LAeq [see Appendix 1 for acoustic terms], which is then corrected for the residual sound (total LAeq excluding the "specific" sound).

A correction for character is made if ***"a tone, impulse or other characteristic occurs".*** For tonality, a correction of between +2dB and 6dB is considered acceptable and for impulsivity between 3 and 9dB. See table

below.

Character	Just Perceptible	Clearly Perceptible	Highly Perceptible
Tonality	+2dB	+4dB	+6dB
Impulsivity	+3dB	+6dB	+9dB

Where the specific sound features characteristics that are neither tonal nor impulsive, though otherwise are readily distinctive against the residual acoustic environment, a penalty of 3 dB can be applied.

Where tonal and impulsive characteristics are present in the specific sound within the same reference period then these two corrections can both be taken into account. If one feature is dominant, then it might be appropriate to apply a single correction. Where both features are likely to affect perception and response, the corrections ought normally to be added in a linear fashion.

Intermittency

When the specific sound has identifiable on/off conditions, the specific sound level ought to be representative of the time period of length equal to the reference time interval which contains the greatest total amount of on time. This can necessitate measuring the specific sound over a number of shorter sampling periods that are in combination less than the reference time interval in total, and then calculating the specific sound level for the reference time interval allowing for time when the specific sound is not present. If the intermittency is readily distinctive against the

residual acoustic environment, a penalty of 3 dB can be applied."

The final figure, including any character correction is known as the Rating level.

This Rating Level is then compared with the measured background [LA90] level. The greater this difference the greater the likelihood of "adverse impact" (See Notes 1 & 2 from BS4142:2014 below).

"NOTE 1

a) Typically, the greater this difference, the greater the magnitude of the impact.

b) A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.

c) A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.

d) The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.

NOTE 2

Adverse impacts include, but are not limited to, annoyance and sleep disturbance. Not all adverse impacts will lead to complaints and not every complaint is proof of an adverse impact."

4.0 MEASUREMENT PROCEDURE

Unattended measurements of background noise were made on 8th April 2025 and attended measurements of background, source and sound insulation were made on 24th April 2025.

The instruments below field calibrated correctly before and after the measurements and had been laboratory calibrated on a two-year schedule.

Model	Instrument	Serial No.	Lab Cal Certificate	Re-Calibration Due
C Svan 957	Sound Level Meter	23201	1504880-2	20/3/2025
Svan SV12L	Preamp	24265	1504880-2	20/3/2025
PCB 377B02	Microphone	LW136090	1504880-2	20/3/2025
H Svan 958A	4 channel Sound/Vib Analyser	69027	1507977-1S	27/2/2026
Svan SV12	Preamp	7030	1507977-1S	27/2/2026
B&K 4155	Microphone	1479113	1507977-1S	27/2/2026
B&K 4231	Calibrator	2084928	1504880-1	20/3/2025

Table 1: Instrumentation Used on Site

For the measurements of background noise, at position 'D' on 8th April 2025 [See Figure 1], meter H above, was mounted in a RION WS02 "all weather" windmuff and a pole at a height of some 1.5m in free-field conditions and located at the position shown in Figure 1.

On 24th April 2025, meter C above was fitted with a standard wind-muff and used on a tripod for the background measurements at 'A' and hand-held for the other measurements, and positions B and C and within the building for the sound insulation measurements.

5.0 MEASUREMENT RESULTS

5.1 Background Levels

5.1.1 8th April 2025 – Background Noise Monitoring

The site was visited on the afternoon of Tuesday 8th April 2025 and the equipment left at position 'D' ; the weather conditions were a temperature around 15 degrees Centigrade, and a wind of Beaufort strength around 3 with the direction from the east. There was 80% cover throughout the measurements.

Some on-site construction activities were taking place so Location 'D' was selected to be as far from any activities as possible; the use of heavy machinery ceased for the afternoon so that a representative background could be established. Distant road traffic was the main background noise source during the monitoring, with the results as shown in Table 2 below.

The average LA90 of the readings was 39.1 LA90. The distribution has been plotted in Figure 2 below; it can be seen that the main mode occurred at 40 LA90. Consequently, 40 LA90 has been taken as the representative background noise level at position 'D'.

End Date & time	Duration	LAmax,F	LAmin	LAeq	L01	L10	L50	L90
08/04/2025 12:18:27	00:15:00	79.9	32.6	57.6	66.9	62	49	38.4
08/04/2025 12:33:27	00:15:00	68.9	33.2	57.5	66.3	62.6	50.1	37.3
08/04/2025 12:48:27	00:15:00	74.4	35.3	58.0	67.7	62.2	50.7	39.3
08/04/2025 13:03:27	00:15:00	75.8	32.7	58.0	66.8	62.7	51.1	39.7
08/04/2025 13:18:27	00:15:00	71.8	32.5	58.4	67.2	63.2	52.6	40.8
08/04/2025 13:33:27	00:15:00	75.8	32.0	58.8	67.7	63.3	53.2	40.5
08/04/2025 13:48:27	00:15:00	69.0	30.7	56.6	66	61.6	48.7	37.9
08/04/2025 14:03:27	00:15:00	73.0	32.4	57.8	66.7	62.5	50.9	40
08/04/2025 14:18:27	00:15:00	73.6	30.6	57.7	67.6	62.3	48.9	37.2
08/04/2025 14:33:27	00:15:00	70.6	32.0	57.3	67.3	62.1	47.7	36.9
08/04/2025 14:48:27	00:15:00	73.0	29.7	57.4	67.2	62	47.8	36.4
08/04/2025 15:03:27	00:15:00	69.2	31.3	57.0	66.4	62.3	48	36.4
08/04/2025 15:18:27	00:15:00	82.4	32.4	59.5	67.7	62.9	52.8	39.6
08/04/2025 15:33:27	00:15:00	76.3	31.9	59.2	69.2	63.4	51.8	37.7
08/04/2025 15:48:27	00:15:00	77.3	35.6	59.0	67.3	62.9	53.5	40.7
08/04/2025 16:03:27	00:15:00	74.1	33.5	59.1	67.8	63.6	53.3	40.3
08/04/2025 16:15:26	00:11:59	71.3	32.5	60.4	67.9	64.6	57.7	46

Table 2: Background noise levels [dBA free field] – 8.4.25 @ Posn 'D'

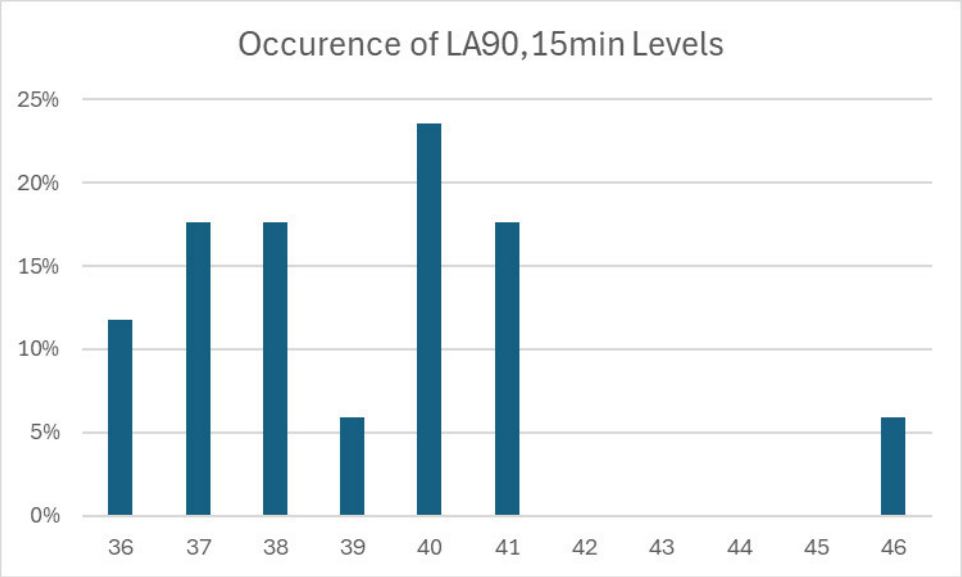

Figure 2: Background noise level distribution [dB LA90,15m free field]

5.1.2 24th April 2025 – Background Noise Monitoring

The site was visited on the afternoon of Thursday 24th April 2025 and on-site construction had mostly ceased by this time, although see below; meter C was located at position 'A' ; the weather conditions were a temperature around 15 to 20 degrees Centigrade, and a wind of Beaufort strength around 3 to 4 with from the east. There was approximately 20 to 50% cover throughout the measurements.

Distant road traffic and a 'green box' at one of the neighbour's properties were the main background noise sources during the monitoring, with the results as shown in Table 3 below. The high readings at 14:30hrs were caused by on-site construction activity [roofing] and have been removed from the background noise analysis.

End Date & time	Duration	LAeq	L01	L10	L50	L90
24/04/2025 13:30:10	00:00:30	45.3	54	48.2	42.5	39.5
24/04/2025 13:45:52	00:15:00	50.3	63.8	51.3	44.5	39.8
24/04/2025 14:00:52	00:15:00	65.3	74.5	68.6	61.9	41.2
24/04/2025 14:15:52	00:15:00	62.4	68.8	67.3	60.8	43.3
24/04/2025 14:30:52	00:15:00	64.7	70.6	68.5	62.7	59.2
24/04/2025 14:45:52	00:15:00	57.4	65.8	60.3	49.7	40.1
24/04/2025 15:00:52	00:15:00	47.8	56.6	50.7	45.6	41.1
24/04/2025 15:15:52	00:15:00	47.4	56.3	50.2	44.7	40.9
24/04/2025 15:30:52	00:15:00	62.6	69.1	67.1	60.6	41.9
24/04/2025 15:45:52	00:15:00	57.2	68.2	61.7	44.8	37.5
24/04/2025 16:00:52	00:15:00	62.3	70.3	67.8	50.1	38.9
24/04/2025 16:15:52	00:15:00	48.3	57	51.1	46.2	40.9
24/04/2025 16:30:52	00:15:00	48.9	58.5	51.7	46.7	39.8
24/04/2025 16:35:51	00:04:59	48.9	58.8	50.7	46.3	40.8

Table 3: Background noise levels [dBA free field] – 24.4.25 @ Position 'A'

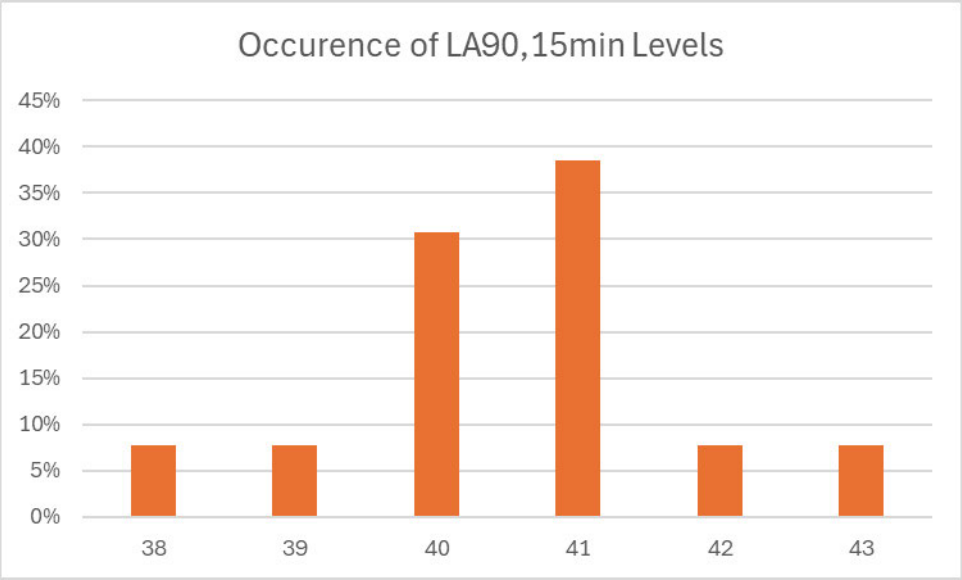

Figure 3: Background noise level distribution [dB LA90,15m free field]

The average LA90 of the readings was 40.4 LA90. The distribution has been plotted in Figure 3 above; it can be seen that the main mode occurred at 40-41 LA90. Consequently, 40 LA90 has been taken as the representative background noise level at position 'A' – c.f. result from Position 'D' which was also 40 LA90.

5.1.3 24th April 2025 – Observations

The author was present during the three hours of the above background/ambient noise measurements at Location A, when vehicle servicing was also taking place with all four bays of the garage occupied by vehicles and all four doors to the building open, employee radio on etc. However, at Location A noise from the garage operation was only occasionally audible [i.e. occasionally the compressor or some tool use

was briefly audible] and in the opinion of the author the noise was not measurable, i.e. the ambient levels at the measurement location were higher than noise from the garage operations.

5.2 Source Transmission Measurements

Following the above observations, a pair of large speakers were set up inside the garage and used to generate a very high level of 'pink noise' inside the garage. The internal reverberant sound level was measured in the important octave bands for approximately one minute, and the corresponding sound pressure levels were measured at locations A, B and C [See Figure 1]. The exercise was carried out firstly with the doors closed and secondly with them open.

In order to minimise the effects of any extraneous noise events [e.g. passing car etc] the measurements were made in terms of L90 levels.

Table 4 below shows the measured levels and the derived difference between noise levels generated inside the garage premises and at the measurement locations.

Location	Doors	Octave Band Centre Frequency [Hz]				
		125	250	500	1k	2k
Measured Levels						
Internal Spkrs	Open	101.3	92.6	88	83.6	88.7
Location A	Open	73.2	59.4	53	52	55.5
Location B	Open	78.6	65.2	57.4	54.1	57.2
Location C	Open	80.5	70.4	61.2	59.5	67.8
Internal Spkrs	Closed	101.1	93.5	88.9	85	90.5
Location A	Closed	73.8	59.3	52.3	50.1	42.6
Location B	Closed	73.5	58	52	49.7	43.6
Location C	Closed	69.8	57	49.1	48.4	48.6
Derived Difference between Internal Level and Measurement Location						
Location A	Open	28.1	33.2	35.0	31.6	33.2
Location B	Open	22.7	27.4	30.6	29.5	31.5
Location C	Open	20.8	22.2	26.8	24.1	20.9
Location A	Closed	27.3	34.2	36.6	34.9	47.9
Location B	Closed	27.6	35.5	36.9	35.3	46.9
Location C	Closed	31.3	36.5	39.8	36.6	41.9

Table 4: Measurements of Sound Transmission [L90]

5.3 Source Noise Levels

Table 5 below details measurements which Martec made in an MOT facility elsewhere; the measurements were reverberant sound pressure levels inside the building.

Operation	Min/hr	Octave Band Centre Frequency [Hz]					dBA
		125	250	500	1000	2000	
Compressor	10.00	69.7	66.0	68.5	67.9	62.7	71.4
Ingasol Rand Nut Runner	5.00	59.3	58.2	62.2	67.8	72.8	78
Makita Angle Grinder	5.00	51.6	56.6	68.4	71.4	77.4	85.1
Gas Welder	5.00	59.7	54.6	56.7	53.4	55.3	62
Hand Hammer	1.00	59.0	61.4	66.6	74.5	82.2	85.8
Exhaust Gas Analyzer	5.00	79.3	72.1	70.9	72.6	72.0	77.4
Horn Test	0.12	62.5	63.7	87.1	93.8	92.9	97.3
Brake Test	5.00	67.7	63.7	65.0	60.2	59.0	66.7

Table 5: Noise Measurements of MOT Garage [Reverberant dB]

Based on the above assumed use [column 2] the operational internal reverberant level inside the proposed buildings can be predicted as follows in Table 6:

Octave Band Centre Frequency [Hz]					dBA
125	250	500	1000	2000	
69.7	63.7	66.3	69.8	71.6	**74.9**

Table 6: Predicted Internal Reverberant SPL [Leq dB]

6.0 ASSESSMENT

6.1 Background Noise Levels

As discussed above, it is considered that 40 LA90 is the representative background noise level.

6.2 Predicted Noise Levels

The predicted internal reverberant level [Leq] in Table 6 can be used with derived differences between internal and external noise levels to predict the LAeq noise levels at the measurement location adjacent to the rear gardens of the nearest properties [Location A], which has been completed in Table 7 below. It should be noted that Position B is actually adjacent to that property's front garden and where the homeowner's car is parked.

Location	Doors	Octave Band Centre Frequency [Hz]					LAeq
		125	250	500	1k	2k	
Location A	Open	41.6	30.5	31.3	38.2	38.4	**42.3**
Location A	Closed	42.4	29.5	29.7	34.9	23.7	**36.4**

Table 7: Predicted Levels from Garage Operations [LAeq]

6.3 Character Correction

As a precautionary measure, if we assume that the operational noise is just perceptible as impulsive and apply the appropriate correction.

6.4 Assessment of the Noise

If we use the predicted noise level and perform an assessment, the results appear as below in Table 8 [doors open] and Table 9 [doors closed].

Condition	Level
Measured/Predicted Ambient Level	42.3
Tonal Correction	0
Impulsive Character	+4
Other Character	0
Intermittancy	0
Rating Level [Specific + Character Correction]	46
Background Noise Level LA90	40
Excess over Background	6
Indication of Adverse Impact but not Significant Adverse Impact, depending on the context	

Table 8: BS4142 Assessment – Nearby Dwellings – Doors Open

Condition	Level
Measured/Predicted Specific Level	36.4
Tonal Correction	0
Impulsive Character	+4
Other Character	0
Intermittancy	0
Rating Level [Specific + Character Correction]	40
Background Noise Level LA90	40
Excess over Background	0
Indication of Low Impact, depending on the context	

Table 9: BS4142 Assessment – Nearby Dwellings – Doors Closed

6.5 Discussion of assessment

It is a requirement of the standard that factors affecting the assessment [uncertainty] are discussed:

1. The above assessment is based on a variable noise source; however, it has been assumed that the unit operates all day at maximum noise level, i.e. the assessment is likely to *over-estimate the impact*.
2. It is considered likely that road traffic noise levels in April, which formed the background noise, are low, and that generally the background noise levels would be higher, i.e. a conservative factor.
3. Overall, the assessment is considered sufficiently robust and demonstrates that appropriate noise limits can be met by the new unit; however, as with all such assessments they cannot

demonstrate that the limits will be met under any and all circumstances; for example, were doors to be left open for prolonged periods or if working to take place outside the building. It would be usual for such matters to be conditioned.

7.0 CONCLUSIONS

The observations on 24th April 2025 over the course of 3 hours indicated that noise from garage is below preexisting ambient levels at the nearest properties' rear gardens.

Based on the measurements, the above assumptions and the available data and calculations of the noise impact, a BS4142 assessment indicates that garage operations at the proposed unit would NOT have a "significantly adverse impact", even if the doors to the unit were left open.

The above indicates that consent can be granted for the development subject to suitably worded noise conditions.

REFERENCES

1. Section 8.22 of "Acoustics and Noise Control - 2nd Edition" - Smith, Peters & Owen - 1996.
2. BS.8233:2014 “Guidance on Sound Insulation and noise reduction for buildings.”
3. National Planning Policy Framework: http://www.communities.gov.uk/publications/planningandbuilding/nppf
4. BS.4142:2014+A1:2019 “Methods for Rating and Assessing Industrial and Commercial Sound”

APPENDIX 1

EXPLANATION OF ACOUSTIC TERMS

The dB or the decibel, is the unit of noise. The number of decibels or the level, is measured using a sound level meter. It is common for the sound level meter to filter or 'weight' the incoming sound so as to mimic the frequency response of the human ear. Such measurements are designated **dB(A)**.

A doubling of the sound is perceived, by most people, when the level has increased by 10 dB(A). The least discernible difference is 2 dB(A). Thus, most people cannot distinguish between, say 30 and 31 dB(A).

The Background level of noise is most commonly represented by the level which is exceeded for 90% of the time i.e. the LA90.

If a noise varies over time then the **equivalent continuous level, or LAeq**, is the notional constant level of noise which would contain the same amount of acoustic energy as the time varying noise.

The following table gives an approximate indication of the comparative loudness of various noises expressed in terms of the A weighted scale:

Source of noise	dB(A)	Nature of Noise
Inside Quiet bedroom at night	25-30	Very Quiet
Quiet office	40-45	
Rural background noise	35-45	
Normal conversational level	55-65	
Busy restaurant	65-75	
Inside suburban electric train	70-80	
Hand clap @ 1m	75-85	
HGV accelerating @ 5m away	85-90	Very Loud

APPENDIX 2

QUALIFICATIONS AND EXPERIENCE OF M. A. KENYON

My full name is Melville Alexander Kenyon. I am the principal of the firm of Martec Environmental Consultants Ltd, a consultancy company that specialises in environmental noise assessment and control. I graduated in 1982 with a Bachelor's degree in Engineering and subsequently a Master's degree in Environmental Acoustics. I have been a corporate member of the professional body for noise and vibration specialists, the Institute of Acoustics, since 1988, and have sat on the British Standards Committee dealing with noise in buildings [BS.8233:1999].

I have lectured at Liverpool John Moores University on the Diploma of Acoustics course and at Manchester Metropolitan University on their Environmental Health degree course. I have been an MSc Dissertation Supervisor at The University of Manchester.

The firm of Martec Environmental Engineering was formed in the 1970's and joined The Association of Noise Consultants in 1996. It is now known as Martec Environmental Consultants Ltd.

Since its formation, Martec has advised many groups of both residents and developers about the problems of noise and vibration in the environment.