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SOLUTIONS

Acoustic Survey and Assessment for Proposed workshop and office unit at Gisburn Auction Mart, Gisburn Road, Gisburn, B7 4ES.

Prepared for:

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1. Introduction

1.1. Martin Environmental Solutions has been commissioned to undertake a noise survey and an acoustic assessment to support planning applications for a new office and workshop building at Gisburn Auction Mart, Gisburn Road, Gisburn.

Site Location and Context

1.2. The site is located to the north of the bust A59, Gisburn Road. To the north is the car park for the Auction Market, to the east an agricultural vehicle/equipment manufacturer site, to the west a petrol station with 1 residential flat above and to the south beyond the road agricultural fields. An aerial photograph is included within Figure 1 showing the above.

1.3. It is the close proximity to the residential property above the petrol station that has raised concerns from the Council over potential disturbance from sound and hence the request for this report.

2. Policy and Guidance

2.1. The impact of noise can be a material consideration in the determination of planning applications. The planning system has the task of guiding development to the most appropriate locations. It is recognised that on occasions it will be difficult to reconcile some land uses, such as housing, hospitals or schools, with other activities that generate high levels of noise. However, the planning system is tasked to ensure that, wherever practicable, noise-sensitive developments are separated from major sources of noise (such as road, rail and air transport and certain types of industrial development).

2.2. The Government's publication of the National Planning Policy Framework (NPPF), updated in July 2018, states that planning policies and decisions should prevent new and existing development from contributing to or being put at unacceptable risk from, of being adversely affected by unacceptable levels of noise pollution.

2.3. The Government have also issued the Noise Policy Statement for England (NPSE). The NPSE clarifies the Government's underlying principles and aims in relation to noise and sets a vision to promote good health and a good quality of life through the effective management of noise while having regard to the Government's sustainable development strategy. The NPSE aims to mitigate and minimise adverse impacts on health and quality of life through the effective management and control of noise.

2.4. The NPSE introduces the following terms although no sound levels are given to represent these many authorities including those within Lancashire have identified the sound level criteria in line with the World Health Organisation, BS8233:2014 and BS4142: 2014 levels. The terms introduced by the NPSE are:

NOEL – No Observed Effect Level (<30dB(A)inside <50dB(A) outside, 10dB below background)
LOAEL – Lowest Observed Adverse Effect Level (30-35dB(A) inside 50-55dB(A) outside, background to +5dB)
SOAEL – Significant Observed Adverse Effect Level (>35dB(A) inside, >55dB(A) outside, >+10dB above background)

2.5. The sound levels within the brackets of the previous paragraph are those determined by Lancashire authorities as appropriate levels to indicate the relevant effect levels represented by the NPSE. These levels are detailed with in the Lancashire Planning

Guidance document on noise which is in the process of being finalised and is currently used by a number of Lancashire authorities.

2.6. Other commonly used examples of standards utilised by Local Planning authorities for the consideration of noise impacts include comparison of the likely noise levels to be experienced at a development, with levels that have been recommended by the World Health Organisation (WHO) as Guidelines for the prevention of Community Noise Annoyance and within BS8233: 2014.

2.7. The WHO recommended noise levels for outdoor amenity areas (gardens) that should not be exceeded are 55dB(A) $L_{Aeq,16hr}$ in order to avoid 'Serious Community Annoyance or 50dB(A) $L_{Aeq,16hr}$ to avoid 'Moderate Community Annoyance' during the day. For indoor levels WHO set 35dB(A) $L_{Aeq,16hr}$ during the day to prevent Moderate Annoyance and 30 dB(A) $L_{Aeq,8hr}$ at night to prevent sleep disturbance.

2.8. The WHO guidance also recommends that maximum sound levels at night should not regularly exceed 45dB(A) within bedrooms to prevent sleep disturbance. Regularly is considered to be more than 10 times during any 8-hour night time period.

2.9. BS 8233:2014 'Guidance on sound insulation and noise reduction for buildings' also specifies desirable noise levels to be achieved inside dwellings.

2.10. BS 8233:2014 'Sound insulation and noise reduction for buildings – Code of Practice' also specifies desirable noise levels to be achieved inside dwellings. BS 8233 presents two levels, the first between the hours of 07:00 – 23:00 and the second between 23:00 -07:00.

2.11. The daytime period suggests internal noise levels of 35dB $L_{Aeq,16hr}$, for resting in living rooms and bedrooms while for night time a level of 30dB LAeq,8hr is recommended. Criteria for external areas mirrors that within the WHO guidance.

2.12. Another commonly used standard is British Standard 4142:2014 'Method for rating industrial and commercial sound' compares the sound predicted by the source in question against the background, L_A90 sound levels.

2.13. The "residual" L_{Aeq} measurement is then subtracted from the "ambient" L_{Aeq} measurement (with the sound source) to calculate the sound level created by the "problem" sound alone -termed the "specific" sound level.

2.14. If the "problem" sound is tonal, such as whine or hum, or if it is impulsive such as bangs or clatters or if it is irregular enough to attract attention a correction is added to the "specific level" to produce the "rating level". The "background" L_{A90} measurement is then compared against the "rating level".

2.15. If the "rating level" exceeds the "background" by around 10dB(A) or more this "indicates a significant adverse impact". A difference of around 5dB(A) 'indicates an adverse impact. The lower the commercial noise level is, the lower the likely impact.

2.16. In addition, the recently published 'ProPG Planning & Noise, Professional Practice Guidance on Planning & Noise, New Residential Development' provides a 4-staged approach to undertaking a risk assessment in relation to anticipated sound levels at new residential development and the provision of mitigation measures. The guidance is principally aimed at sites exposed predominantly to noise from transportation sources.

2.17. The first stage consists of an initial noise risk assessment, based on indicative day and night-time *noise* levels. Simple put the higher the ambient noise in an area the greater the impact. The levels given are shown below although it should be noted that these are in excess of both the Lancashire guidance, WHO and BS 8233: 2014.

Noise Risk Category*	Potential Effect if Unmitigated	Pre-Planning Application Guidance
0 – Negligible $L_{Aeq,16hr}$ <50dB $L_{Aeq,8hr}$ <40dB	May be noticeable but no adverse effect on health and quality of life	In this category the development is likely to be acceptable from a noise perspective, nevertheless a good acoustic design process is encouraged to improve the existing environment and/or safeguard against possible future deterioration and to protect any designated tranquil areas. A noise assessment may be requested to demonstrate no adverse impact from noise. Application need not normally be delayed on noise grounds.
1 – Low $L_{Aeq,16hr}$ 50-63dB $L_{Aeq,8hr}$ 40-55dB	Adverse effect on health and quality of life	In this category the development may be refused unless a good acoustic design process is followed and is demonstrated via a Level 1 Acoustic Design Statement which confirms how the adverse impacts of noise on the new development will be mitigated and minimised and that a significant adverse impact will not arise in the finished development. Planning conditions and other measures to control noise may be required.
2 – Medium $L_{Aeq,16hr}$ 63-69dB $L_{Aeq,8hr}$ 55-60dB L_{AFmax} >80dB**	Significant adverse effect on health and quality of life	In this category the development is likely to be refused unless good acoustic design process is followed and is demonstrated via a Level 2 Acoustic Design Statement which confirms how the adverse impacts of noise on the new development will be mitigated and minimised, and clearly demonstrates that a significant adverse noise impact will not arise in the finished development. Planning conditions and other measures to control noise will normally be required.
3 – High $L_{Aeq,16hr}$ >69dB $L_{Aeq,8hr}$ >60dB L_{AFmax} >80dB**	Unacceptable adverse effect of health and quality of life	In this category the development is very likely to be refused on noise grounds, even if a good acoustic design process is followed and is demonstrated via a Level 2 Acoustic Design Statement. Applicants are advised to seek expert advice on possible mitigation measures. Advice on the circumstances when the refusal of a new housing on noise grounds should normally be anticipated is included in the ProPG.

2.18. Stage 2, consists of a full assessment of the prevailing ambient noise and is required considered 4 elements to be considered:

I. Element 1 – Good Acoustic Design
II. Element 2 – Internal Noise Level Guidelines
III. Element 3 – External Amenity Area Nosie Assessment
IV. Element 4 – Assessment of Other Relevant Issues

2.19. A good acoustic design is implicit in meeting the requirements of the NPPF and can help to resolve many potential acoustic issues.

2.20. Details of the criteria considered suitable are provided above for both internal and external sound levels. Element 4 includes such issues as local and national policy, likely occupants, wider planning objectives.

3. The Assessment

3.1 The proposed development will be utilised by the adjoining manufacture ring site and will consist of new offices, showroom for finished equipment and a servicing bay. The layout of the building will have the office accommodation adjacent to the petrol station, then the showroom and finally the service centre to the far east of the building. Operational hours for the business will be 07:00-18:00 Monday to Saturday.

3.2 In order to obtain representative sound levels for the area on-site sound monitoring was undertaken on the 30th January 2019, the Auction Mart was not in operation. The sound level meter was positioned on the boundary of the petrol station, behind, but above the oil storage tank onsite. This would have provided some attenuation from road traffic noise and is representative of the nearest window to the first floor flat.

3.3 The weather at the time was dry, cold and with no wind. All measurements were made using a Cirrus, Optimus Green CR-171C, Type 1 sound level meter. The meter was calibrated before and after use and no significant deviation was identified. The calibration certificates are available on request.

3.4 The full results for the days monitoring are presented in Appendix 1 and identified an average level of 63.6dB $L_{Aeq,\ 11hours}$ with an average background level of 50.5dB L_{A90}. The results show that the sound levels were fairly consistent throughout the day and were dominated by passing traffic.

3.5 In order to assess the likely impact from the new building sound level monitoring was undertaken within the existing manufacturing facility. This is considered to represent a worse case situation as the proposed development will not involve any manufacturing and will be inherently quieter than the current facility.

3.6 The hourly average sound level inside the manufacturing building during operation was identified as 69.9dB $L_{Aeq,1hr}$.

3.7 As mentioned above the proposed office accommodation and showroom will be placed between the service centre and the petrol station. This will substantially reduce the direct sound level to be experienced at the flat, with at least two substantial intervening walls between the source and receptor. These being the outer wall of the proposed building and the inner blockwork wall between the service area and the showroom, offices. In additional a number of internal stud walls will be formed to make the various

internal rooms. A reduction of at least 50dB will be achieved, and this when taking into account distance attenuation, the service area would not be heard through the building.

$$SPL_{ext} = SPR_{int-}attenuation\ (R_w) - 6$$

$$13.9dB(A) = 69.9 - 50 - 6$$

$$Dist\ att = 20log\left(\frac{r}{R}\right)$$

$$25dB = 20log\left(\frac{1}{17.8}\right)$$

$$-11.1dB(A) = 13.9 - 25$$

3.8 Sound from the service area will however escape from the front of the building which has been orientated to face north away from the flat. In order for the sound to reach the flat it would have to travel 180^0 down the side of the building. The building structure would also act as another barrier with a 27dB reduction, based on the path difference between a straight line from the door opening. The distance attenuation will provide a further 31.1dB(A) attenuation over a 36m distance, 1m from the doorway

$$Dist\ att = 20log\left(\frac{r}{R}\right)$$

3.9 Therefore, ignoring the directivity of the doorway and taking into account the building barrier attenuation and the distance attenuation assuming the 69.9dB(A) at the doorway as measured inside the manufacturing area a sound level of 11.8dB(A) will be experienced outside the flat.

3.10 Bearing in mind that an open window provides 15dB attenuation[1] the proposed development will not be heard inside the flat.

3.11 It is also appropriate to undertake a BS4142:2014 assessment for the proposed building. This assessment compares the sound to be experienced at the receptor with the background sound level and is shown in the table below.

[1] BS8233: 2014; Guidance on sound insulation and noise reduction for buildings

Measured Ambient sound level		
Residual Sound level	L_{Aeq} = 63.6dB	Average of background sound level in area, measured
Background Sound Level	L_{A90} = 50.5dB	Measured on site
Reference period 60 minutes		Normal ref period,
Specific sound Level	L_{Aeq} = 11.8dB	Calculated at receptor facade
Acoustic feature	3dB + 3dB	Intermittency – bangs, stop start of engines Impulsivity - bangs
Rating level	11.8+6 = 17.8dB	
Background sound level	L_{A90} = 50.5dB	
Excess of Rating level over background level	(17.8-50.5) dB = -**32.7dB** indicates no significant adverse impact	
Uncertainty		The nature of the acoustic feature corrections may not exist. Sound level at the receptor is likely to be lower due to directivity of sound source.

4 Conclusion

4.1 The proposed development has been carefully designed to minimise any impact on the adjacent residential flat. Orientated to direct any sound emissions away from the flat, and with the service area located as far away from the residential property as possible.

4.2 On-site monitoring of both the background sound level over a typical day (without the Auction Market) and typical manufacturing activities at the existing site have been undertaken and this information used to determine the worse-case impact on the adjacent residential flat.

4.3 The calculations undertaken have demonstrated that the proposed development will not have an impact on the flat and in line with the Noise Policy Statement for England (NPSE) a No Observe Effect Level (NOEL) can be applied to the development. As the development will not result in a significant adverse impact the development complies with the National Planning Policy Framework and is therefore in terms of noise is acceptable.

Figure 1 – Aerial Photograph

Appendix 1 – Monitoring Results

Background

Time	Duration	L_{Aeq} (dB)	L_{AMax} (dB)	L_{A90} (dB)
30/01/2019 07:00	01:00:00	63.2	77.3	49.8
30/01/2019 08:00	01:00:00	63.8	77	52.8
30/01/2019 09:00	01:00:00	63.2	78.9	48.5
30/01/2019 10:00	01:00:00	62.8	78.6	49.0
30/01/2019 11:00	01:00:00	63.6	76.3	50.3
30/01/2019 12:00	01:00:00	63.2	83.5	50.1
30/01/2019 13:00	01:00:00	63.3	86.2	49.2
30/01/2019 14:00	01:00:00	64.0	77.9	51.7
30/01/2019 15:00	01:00:00	63.8	75.9	50.3
30/01/2019 16:00	01:00:00	64.3	85.4	52.9
30/01/2019 17:00	01:00:00	63.7	79.5	51.5

Start Time	Duration	L_{Aeq}	L_{AMax}	L_{A90}
30/01/2019 07:00	10:59:59	63.6	86.1	50.5

Manufacturing

Time	Duration	L_{Aeq} (dB)
30/01/2019 13:00	00:30:00	65.5
30/01/2019 13:30	00:30:00	71.7
	01:00:00	69.64