

Noise Impact Assessment

Land off Reliance Street, Manchester

Client: Paul McKenna

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Assessment of maximum noise levels as requested by Council.					

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EXECUTIVE SUMMARY

Professional Consult Limited was appointed by Paul McKenna to prepare a Noise Impact Assessment for the construction of a two-storey building to form 3 no. light industrial units (Class B1) on a currently vacant parcel of land off Reliance Street in Manchester M40 3AG.

This Assessment has been undertaken to identify the key noise sources associated with the proposed operation and determine potential noise impacts at the closest noise sensitive receptors. Accordingly, this Assessment has been completed with due regard to the National Planning Policy Framework and its associated National Planning Policy Guidance and BS4142:2014+A1:2019. At the request of Manchester City Council, this Assessment has been updated to include a prediction of the maximum noise levels generated by the Site at the closest residential receptor which has shown compliance with the adopted noise criteria.

In conclusion, the predicted noise levels at the identified receptors are sufficiently low enough to accord with the 'No Observed Effect Level' as detailed in the PPG.

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1 INTRODUCTION

1.1 Background

1.1.1 Professional Consult Limited was appointed by Paul McKenna to prepare a Noise Impact Assessment ('the Assessment') for the construction of a two-storey building to form 3 no. light industrial units (Class B1) on a currently vacant parcel of land ('the Site') off Reliance Street in Manchester M40 3AG.

1.1.2 Manchester City Council has granted planning permission (App. Ref.119669/FO/2018) for the above development subject to a number of conditions, with the following being applicable to noise:

'Condition 7) Notwithstanding the details submitted, before any use hereby approved commences, the premises shall be acoustically insulated and treated to limit the break out of noise in accordance with a noise study of the premises and a scheme of acoustic treatment that has been submitted to and approved in writing by the City Council as local planning authority. The scheme shall be implemented in full before the use commences.

Condition 8) Prior to first use of the development any external equipment, insulation, Externally mounted ancillary plant, equipment and servicing shall be selected and/or acoustically treated in accordance with a scheme designed so as to achieve a rating level of 5dB (L_{Aeq}) below the typical background (L_{A90}) level at the nearest noise sensitive location. The scheme shall be submitted to and approved in writing by the City Council as local planning authority in order to secure a reduction in the level of noise emanating from the site.'

1.1.3 It is understood that there is to be no externally mounted plant and so Condition 8 can be discharged on the basis of the Condition not being applicable to this development.

1.1.4 Condition 7 relates to noise break-out from the proposed commercial units and so this Noise Impact Assessment is concerned with the potential noise impact from future operations, within the proposed commercial units, impacting upon the closest existing residential dwellings.

1.1.5 It is understood that the Site can operate between 09:00 – 17:00 Monday – Saturday and at no time on a Sunday or Bank Holiday.

1.1.6 This Assessment has been undertaken to identify the key noise sources associated with the proposed operation and determine potential noise impacts at the closest noise sensitive receptors. Accordingly, this Assessment has been completed with due regard to the National Planning Policy Framework and its associated National Planning Policy Guidance and BS4142:2014+A1:2019.

1.1.7 The Assessment has been updated at the request of the Council to include for consideration of predicted maximum noise levels, from operation of the units, at the closest residential dwellings. It should be noted that an assessment of maximum noise levels is not a requirement of BS4142:2014+A1:2019 and in any event, is only normally applicable to the assessment of night-time-time noise impacts

1.1.8 All acronyms used within this report are defined in the Glossary presented in Appendix 2.

1.2 Limitations

1.2.1 The limitations of this report are presented in Appendix 1.

1.3 Confidentiality

1.3.1 Professional Consult has prepared this report solely for the use of the Client and those parties with whom a warranty agreement has been executed, or with whom an assignment has been agreed. Should any third party wish to use or rely upon the contents of the report, written approval must be sought from Professional Consult; a charge may be levied against such approval.

2 POLICY & GUIDANCE

2.1 National Planning Policy Framework & National Planning Practice Guidance

- 2.1.1 The Government published the National Planning Policy Framework (NPPF) in March 2012 and the National Planning Practice Guidance (NPPG) in March 2014. Together, the NPPF and NPPG set out what the Government expects of local authorities. The overall aim is to ensure the planning system allows land to be used for new homes and jobs, while protecting valuable natural and historic environments.
- 2.1.2 The NPPG adds further context to the NPPF and it is intended that the two documents should be read together.
- 2.1.3 Noise needs to be considered when new developments may create additional noise and when new developments would be sensitive to the prevailing acoustic environment. When preparing local or neighbourhood plans, or taking decisions about new development, there may also be opportunities to consider improvements to the acoustic environment.
- 2.1.4 Local planning authorities' plan-making and decision making should take account of the acoustic environment and in doing so consider:
- ② Whether or not a significant adverse effect is occurring or likely to occur;
 - ② Whether or not an adverse effect is occurring or likely to occur; and
 - ② Whether or not a good standard of amenity can be achieved.
- 2.1.5 In line with the Explanatory Note of the Noise Policy Statement for England, this would include identifying whether the overall effect of the noise exposure (including the impact during the construction phase wherever applicable) is, or would be, above or below the significant observed adverse effect level and the lowest observed adverse effect level for the given situation.
- 2.1.6 The Observed Effect Levels are as follows:
- ② Significant observed adverse effect level: This is the level of noise exposure above which significant adverse effects on health and quality of life occur;
 - ② Lowest observed adverse effect level: this is the level of noise exposure above which adverse effects on health and quality of life can be detected; and
 - ② No observed effect level: this is the level of noise exposure below which no effect at all on health or quality of life can be detected.
- 2.1.7 Table 1 summarises the noise exposure hierarchy, based on the likely average response.

Table 1. Noise Exposure Hierarchy

Perception	Examples of Outcomes	Increasing Effect Level	Action
Not Noticeable	No Effect	No Observed Effect	No specific measures required
Noticeable and not intrusive	Noise can be heard but does not cause any change in behaviour or attitude. 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
<i>Lowest Observed Adverse Effect Level</i>			
Noticeable and intrusive	Noise can be heard and causes small changes in behaviour and/or attitude, 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 perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
<i>Significant Observed Adverse Effect Level</i>			
Noticeable and disruptive	The noise causes a material change in behaviour and/or attitude, 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 Effect	Avoid
Noticeable and very disruptive	Extensive and regular changes in behaviour and/or an inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory	Unacceptable Adverse Effect	Prevent

2.1.8 The subjective nature of noise means that there is not a simple relationship between noise levels and the impact on those affected. This will depend on how various factors combine in any particular situation.

2.1.9 These factors include:

- ② The source and absolute level of the noise together with the time of day it occurs. Some types and level of noise will cause a greater adverse effect at night than if they occurred during the day - this is because people tend to be more sensitive to noise at night as they are trying to sleep. The adverse effect can also be greater simply because there is less background noise at night;
- ② For non-continuous sources of noise, the number of noise events, and the frequency and pattern of occurrence of the noise;
- ② the spectral content of the noise and the general character of the noise. The local topology and topography should also be taken into account along with the existing and, where appropriate, the planned character of the area.

2.1.10 More specific factors to consider when relevant:

- ② where applicable, the cumulative impacts of more than one source should be taken into account along with the extent to which the source of noise is intermittent and of limited duration;
- ② Consideration should also be given to whether adverse internal effects can be completely removed by closing windows and, in the case of new residential development, if the proposed mitigation relies on

windows being kept closed most of the time. In both cases a suitable alternative means of ventilation is likely to be necessary. Further information on ventilation can be found in the Building Regulations; and

- ② If external amenity spaces are an intrinsic part of the overall design, the acoustic environment of those spaces should be considered so that they can be enjoyed as intended.

2.2 Local Authority Guidance and Criteria – Manchester City Council

2.2.1 Manchester City Council has granted planning permission (App. Ref.119669/FO/2018) for the development subject to a number of conditions, with the following being applicable to noise:

‘Condition 7) Notwithstanding the details submitted, before any use hereby approved commences, the premises shall be acoustically insulated and treated to limit the break out of noise in accordance with a noise study of the premises and a scheme of acoustic treatment that has been submitted to and approved in writing by the City Council as local planning authority. The scheme shall be implemented in full before the use commences.

Condition 8) Prior to first use of the development any external equipment, insulation, Externally mounted ancillary plant, equipment and servicing shall be selected and/or acoustically treated in accordance with a scheme designed so as to achieve a rating level of 5dB (LAeq) below the typical background (LA90) level at the nearest noise sensitive location. The scheme shall be submitted to and approved in writing by the City Council as local planning authority in order to secure a reduction in the level of noise emanating from the site.’BS4142:2014+A1:2019 ‘Methods for rating and assessing industrial and commercial sound’

2.3 BS4142:2014+A1:2019 ‘Methods for rating and assessing industrial and commercial sound’

2.3.1 This standard describes methods for rating and assessing sound of an industrial or commercial nature which includes:

- ② Sound from industrial and manufacturing processes;
- ② Sound from fixed installations which comprise mechanical and electrical plant and equipment;
- ② Sound from the loading and unloading of goods and materials at industrial and / or commercial premises; and,
- ② Sound from mobile plant and vehicles that is an intrinsic part of the overall sound emanating from processes or premises, such as that from forklift trucks, or that from train or ship movements on or around an industrial or commercial Site.

2.3.2 The procedure detailed in the standard compares the measured or predicted noise level 'the specific noise level' from any of the above detailed noise sources with the background sound level at a residential dwelling. The measured background sound level at a receptor should be reliable and should not necessarily ascertain a lowest measured background sound level, but rather to quantify what is 'typical.'

2.3.3 The specific noise level also acknowledges the following reference time intervals depending upon whether the noise source operates during daytime or night-time periods:

- ② Daytime (07:00 - 23:00): 1 hour; and
- ② Night-time (23:00 - 07:00): 15 minutes.

2.3.4 There are a number of 'penalties' which can be attributed to the specific sound level, either subjectively or objectively, depending upon the 'acoustic features' of the sound level under investigation as follows. These penalties vary in their weighting depending upon the severity of the acoustic feature, as follows (with regards to the subject method):

Tonality

- ② +2dB: where the tonality is just perceptible;
- ② +4dB: where the tonality is clearly perceptible; and
- ② +6dB: where the tonality is highly perceptible.

Impulsivity

- ② +3dB: where the impulsivity is just perceptible;
- ② +6dB: where the impulsivity is clearly perceptible; and
- ② +9dB: where the impulsivity is highly perceptible.

Intermittency

- ② +3dB: where the intermittency is readily distinctive against the acoustic environment.

2.3.5 Where the assessment is carried out using the objective method, the tonality penalty is either 0dB or 6dB and the impulsivity penalty can range from 0dB up to 9dB in increments of 1dB, depending on the level of impulsivity identified.

2.3.6 In addition to the above acoustic features, there is a penalty for 'other sound characteristics' of +3dB where a sound exhibits characteristics that are neither tonal nor impulsive, though is readily distinctive against the acoustic environment.

2.3.7 BS4142 goes on to state that the rating level is equal to the specific sound level if there are no such features present or expected to be present.

2.3.8 Assessment of the rating level relative to the background noise level can yield the following commentary:

- ② Typically, the greater this difference (between the rating level and the background sound level), the greater the magnitude of impact;
- ② A difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context;
- ② A difference of around +5dB is likely to be an indication of an adverse impact, depending on the context; and
- ② 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. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact.

2.3.9 Whilst the amended 2019 Standard does make various references to it not being intended to assess noise impacts at indoor locations, section 1.1 does state *'The methods described in this British Standard use outdoor sound levels to assess the likely effects of sound on people who might be inside or outside a dwelling or*

premises used for residential purposes upon which sound is incident'. Example 6 in the Standard states 'In addition to the rating/background sound level comparison shown in Table A.6, the primary concern is the potential for disturbance of residents who could be sleeping with open bedroom windows. Other guidance, such as BS 8233, might also be applicable in this instance'. Furthermore, Example 8, which considers night-time commercial noise impacts at a dwelling states 'BS 8233 indicates that 40 dBA sound level from the plant, equating to an internal level of around 30 dBA or possibly lower, but with some acoustically distinguishing characteristics, may not be suitable for a bedroom.'

- 2.3.10 With the above in mind, and for a clear need to ensure that any potential commercial or industrial noise impacts at the building façade do not give rise to internal noise level which causes sleep disturbance in bedrooms, this Assessment will ensure that the predicted rating level (specific sound level including any character corrections) does not exceed 30dB in bedrooms.

3 NOISE SURVEYS

3.1.1 In order to inform an accurate and robust Assessment, Professional Consult has completed a number of noise surveys as follows:

- ② A noise survey completed at an existing joinery workshop adjacent to the Site, similar to that which may be accommodated in one of the proposed units at the Site; and
- ② A background sound survey completed over a full weekday and weekend period at a location considered to be representative of the closest residential receptors to the Site. Background sound levels on a Saturday will be lower than those expected during a weekday period and so is considered worst-case.

3.1.2 In addition to the above surveys, in agreement with the client and in the interests of a robust Assessment, Professional Consult has used library noise level data for a car repair workshop should all three units be used for this purpose.

3.2 Joinery Workshop Noise Survey

3.2.1 Professional Consult completed an internal noise survey at an existing joinery workshop over the following time period:

- ② 11:04 – 11:10, 9th July 2019.

3.2.2 The noise climate in the workshop was dominated by continuously running extract fans which had been activated to present worst-case internal noise levels. The microphone of the sound level meter was located in the centre of the building and so the measured internal has been taken as the general overall reverberant noise level.

3.2.3 Table 2 summarises the measured noise levels.

Table 2. Summary of Measured Noise Levels

Period	Measured Operation	Measured Sound Pressure Level $L_{Aeq,t}$ (dB)	On-time / 1hr (mm:ss)	Measurement Distance (m)
11:04 – 11:10	Extract fans	61.1	60:00	N/A – Reverberant conditions

Note: Highest maximum measured noise level was 76.1dB $L_{Amax,fast}$

3.3 Background Sound Survey

3.3.1 The proposed units can operate Monday – Saturday 09:00 – 17:00. As such, background sound levels have been measured on Site – the sound climate before the existing units commenced operation at the same time being considered as typical of the background sound climate at the residential dwellings on Eager Street. Before operations begin at the existing commercial units, the noise climate is primarily composed of distant road traffic noise from vehicles using the A62 Oldham Road.

3.3.2 Professional Consult completed a background sound survey over the following period:

- ② 14:00, Thursday 4th July – 11:00, Monday 8th July 2019.

3.3.3 The background noise levels measured between 07:00 – 07:30 ie immediately prior to operation commencing, on both Friday morning and Saturday mornings, have been taken as appropriate and worst case in order to

inform the Assessment and these background noise levels are detailed in Table 3. The full background noise levels are presented in Appendix 4.

Table 3. Summary of Measured Background Sound Measurements

Period	Measured Background Sound Level, $L_{A90,30\text{mins}}$ (dB)
Friday 5 th July, 07:00 – 07:30*	46.3
Saturday 6 th July, 07:00 – 07:30*	44.4

*Although operations at the Site cannot start until 09:00, the period 07:00 – 07:30 does not contain any commercial sound from the surrounding units

3.4 Existing Car Garage Noise Survey

3.4.1 Professional Consult recently completed an internal noise survey at an existing car repair garage over the following time period and Table 4 summarises the measured noise levels.

Table 4. Summary of Measured Noise Levels

Period	Operation	Measured Sound Pressure Level $L_{Aeq,t}$ (dB)	On-time / 1hr (mm:ss)	Measurement Distance (m)
08:00 – 09:00	Significant work on cars	68.4	02:28	N/A – Reverberant conditions
	General garage operations	63.7	26:12	
09:00 – 10:00	Significant work on cars	69.2	02:50	
	General garage operations	58.5	24:20	
10:00 – 11:00	Significant work on cars	70.8	02:15	
	General garage operations	65.2	57:08	

Note: Highest maximum measured noise level was 100.8dB $L_{Amax,fast}$

3.4.2 The noise climate inside the garage comprised mainly of general car maintenance and servicing activities (termed ‘general garage operations’) with intermittent short periods of low levels of noise. In addition, there were intermittent periods (termed ‘significant work on cars’) which generated high levels of noise for short periods of time including hammering, use of air guns for wheel nuts and impulsive noise as cars used the lifting ramps.

3.4.3 The microphone of the sound level meter was installed in the centre of the garage space with no fixed noise source due to various activity and so the measured internal has been taken as the general overall reverberant noise level within the building.

3.5 Survey Equipment

3.5.1 The following equipment was used for the Noise Surveys.

Table 5. Noise Measurement Equipment

Measurement Position	Equipment Description	Manufacturer & Type No	Serial No.	Calibration Due Date
Background Survey, Joinery Workshop Survey & Existing Car Garage Survey.	Sound Level Meter	01dB Fusion	12038	26 March 2021
	Pre-amplifier	01dB PRE22	1805093	
	Microphone	GRAS 40CE	330801	
	Calibrator	01dB CAL-31	87280	06 March 2020

3.5.2 The sound level meter was field calibrated prior to and following the survey and no significant drift was identified.

3.5.3 During the Background Sound Survey the meteorological conditions were monitored as per the requirement in BS4142:2014+A1:2019, with the weather conditions were conducive to the measurement of environmental noise, i.e. wind speeds were below 5m/s with dry conditions. Table 6 provides a summary of the measured wind speeds.

Table 6. Range of Measured Wind Speeds

Period	Range of Measured Wind Speeds (m/s)	Rainfall Recorded?
14:00, Thursday 4 th July – 11:00, Monday 8 th July	0 – 4.41	No

4 NOISE IMPACT ASSESSMENT

4.1.1 This Assessment will consider the noise impact from both the Joinery Workshop and Car Garage at the closest residential receptors on Eager Street.

4.1.2 Professional Consult have been supplied with the following information regarding the building specification:

- ② Dimensions of each of the three units are understood to be 13.7m(l) x 8.7m(w) x 6.7m(h); and
- ② The building fabric details have not been provided and so it is assumed, from a building of this nature and given Professional Consults experience of dealing with similar projects, that the walls will comprise of single-skin metal cladding which will afford a sound reduction index of 24dB R_w and the roof will comprise metal upstand cladding over a steel portal frame which will afford the same sound reduction index. Where a building component contains an open façade, ie a door, the sound reduction will be taken as 0dB R_w .

4.1.3 Calculation of the sound pressure level immediately outside the building components (ie north façade, roof etc) has been completed using the following equation:

②
$$\text{SPL outside} = \text{SPL inside} - R - 6\text{dB}$$

Where: 'R' is the Sound Reduction Index for the building component

4.1.4 Calculation of the sound power level for each building component by using the following equation:

②
$$L_w = \text{SPL} + 10 \times \log S$$

Where: 'S' is the surface area in square meters of the building component

4.1.5 Calculation of the sound pressure level, from each building component at the receptor, by using the following equation:

②
$$\text{SPL} = L_w - 20 \times \log r - 8$$

Where: 'r' is the distance in metres from the individual building component to the receptor.

4.1.6 Calculation of the combined sound pressure level from the applicable building components at the receptor, by using the following equation:

②
$$\text{SPL}_{\text{Total}} = 10 \times \log (10^{(L1/10)} + 10^{(L2/10)} \dots\dots)$$

4.1.7 Professional Consult has made the following assumptions for the building components:

4.1.8 The roof only has had a directionality correction of -3dB when calculating the component noise level at the receptor.

4.1.9 With regards to the residential receptor, not all of the building components will produce a noise impact at the receptor, for example where a building component faces away from a receptor then it's impact will be considered negligible. Table 7 identifies the applicable building components for each receptor so an accurate noise level for each receptor can be calculated.

Table 7. Residential Receptors and Applicable Building Components

Receptor	Applicable Building Façade
Eager Street	north, east & roof

4.2 Joinery Workshop Assessment

4.2.1 Table 8 calculates the sound power level of the various building components.

Table 8. Calculation of Sound Power Levels for Façade & Roof Components

	Building Component		
	North Façade	East Façade	Roof
SPL Internal (dB)	61.1	61.1	61.1
SRI (dB)	0*	24	24
-6 dB	-6	-6	-6
SPL Immediately Outside (dBA)	55.0	31.0	28
Area of Building Component (m²)	58.29	91.79	119.19
Sound Power Level of Component (dBA)	72.7	50.6	48.8
*Assumes open door			

4.2.2 Table 9 calculates the overall sound pressure level at the dwellings on Eager Street.

Table 9. Calculation of Total Sound Pressure Level at Eager Street

	North Façade	East Façade	Roof
Sound Power Level of Component (dB)	72.7	50.6	48.8
Distance to Receptor (m)	90	86	90
Directionality Correction (dB)	0	0	-3
Calculated Sound Pressure Level at Receptor (dB)	25.6	3.9	1.7
Overall Sound Pressure Level at Receptor (dB)	25.6		
Quantity Correction for 3 x Units	30.4		

Barrier Attenuation (dB)	-10*
Total Combined Sound Pressure Level at Receptor (dB)	20.4
*Line of sight removal to ground floor of dwellings / garden by intervening buildings	

4.2.3 The following has been considered in determining if any acoustic features exist in the predicted noise level at the closest residential receptors:

- ② Tonality - In determining if any tones exist in the measured noise levels, the methodology set out in BS4142:2014 has been followed using the objective method – either a 0dB penalty is allocated where no tones are present or 6dB penalty is allocated where tonality is present;
- ② Impulsivity – in determining if any impulsiveness is evident in the measured noise levels, the methodology set out in BS4142:2014 has been followed using the objective method which can result in a penalty from 0dB to 9dB being allocated depending upon the extent of impulsiveness;
- ② Intermittency – whether or not the measured operations turn on or off during the (1hr) assessment period;
- ② Other sound characteristics – where no penalties are allocated for the above features, but there will be an audible noise at the closest receptor.

4.2.4 Table 10 allocates appropriate character corrections.

Table 10. Allocation of Character Corrections

Measured Operation	Tonality Correction (dB)	Impulsivity Correction (dB)	Intermittency Correction (dB)	Other Sound Characteristics Correction (dB)
Extract Fans	0	0	3	0
Highest Allocated Correction for Assessment Period	0	0	3	0
Total Overall Correction to be added to Specific Noise Level at Receptor	+3			

4.2.5 Table 11 completes the BS4142 Assessment.

Table 11. BS4142 Assessment

Receptor	Calculated Specific Noise Level (dB)	Total Overall Character Correction (dB)	Calculated Rated Level (dB)	Median (Typical) Background Sound Level $L_{A90,t}$ (dB)	Criteria* (dB)	Difference +/- (dB)
Eager Street	20.4	+3	23.4	44.0	39.0	-15.6

*Manchester City Council require the rated level of noise to be no greater than 5dB below background

4.2.6 Table 11 indicates that the rated level of noise falls below the criteria noise level imposed by Manchester City Council and so there is no requirement to consider noise mitigation measures.

4.2.7 Manchester City Council have requested that an assessment of maximum noise levels is included within the Assessment. Table 12 predicts the maximum noise level at the Receptor and compares the predicted noise level with the most applicable criteria.

Table 12. Maximum Noise Level Assessment

Receptor	Highest Measured Maximum Noise Level (dB)	Distance to Receptor (m)	Calculated Noise Level at Receptor (dB)	External Noise Criteria Level* (dB)	Difference +/- (dB)
Eager Street	76.1	86	27.4*	60	-32.6
*Includes 10dB barrier attenuation					

4.2.8 Table 12 indicates that the maximum noise level falls below the external noise criteria limit presented in BS8233:2014. With a partially open window this external noise level will afford an approximate internal noise level of 12.4dB which falls below the internal noise criteria level of 45dB(A).

4.3 Car Garage

4.3.1 The measured noise levels taken within the car repair garage need to be time-corrected to accord with the reference period detail in BS4142 which is 1-hr for the daytime period – Table 13 details the time corrected noise levels.

Table 13. Time Corrected Noise Levels

Period	Operation	Measured Sound Pressure Level $L_{Aeq,t}$ (dB)	On-time / 1hr (mm:ss)	Calculated $L_{Aeq,1hr}$ (dB)	Overall Internal Noise Level for Period (dB)
08:00 – 09:00	Significant work on cars	68.4	02:28	54.6	61.2
	General garage operations	63.7	26:12	60.1	
09:00 – 10:00	Significant work on cars	69.2	02:50	56.2	58.4
	General garage operations	58.5	24:20	54.5	
10:00 – 11:00	Significant work on cars	70.8	02:15	56.4	65.5
	General garage operations	65.2	57:08	65.0	

4.3.2 Table 14 calculates the sound power level of the various building components.

Table 14. Calculation of Sound Power Levels for Façade & Roof Components

	Building Component		
	North Façade	East Façade	Roof
SPL Internal (dB)	65.5	65.5	65.5
SRI (dB)	0*	24	24
-6 dB	-6	-6	-6
SPL Immediately Outside (dBA)	59.5	35.5	32.5

Area of Building Component (m ²)	58.29	91.79	119.19
Sound Power Level of Component (dBA)	77.2	55.1	53.3
*Assumes open door			

4.3.3 Table 15 calculates the overall sound pressure level at the dwellings on Eager Street.

Table 15. Calculation of Total Sound Pressure Level at Eager Street

	North Façade	East Façade	Roof
Sound Power Level of Component (dB)	77.2	55.1	53.3
Distance to Receptor (m)	90	86	90
Directionality Correction (dB)	0	0	-3
Calculated Sound Pressure Level at Receptor (dB)	30.1	8.4	6.2
Overall Sound Pressure Level at Receptor (dB)	30.1		
Quantity Correction for 3 x Units	34.9		
Barrier Attenuation (dB)	-10*		
Total Combined Sound Pressure Level at Receptor (dB)	24.9		
*Line of sight removal to ground floor of dwellings / garden by intervening buildings			

4.3.4 The following has been considered in determining if any acoustic features exist in the predicted noise level at the closest residential receptors:

- ② Tonality - In determining if any tones exist in the measured noise levels, the methodology set out in BS4142:2014 has been followed using the objective method – either a 0dB penalty is allocated where no tones are present or 6dB penalty is allocated where tonality is present;
- ② Impulsivity – in determining if any impulsiveness is evident in the measured noise levels, the methodology set out in BS4142:2014 has been followed using the objective method which can result in a penalty from 0dB to 9dB being allocated depending upon the extent of impulsiveness;
- ② Intermittency – whether or not the measured operations turn on or off during the (1hr) assessment period;
- ② Other sound characteristics – where no penalties are allocated for the above features, but there will be an audible noise at the closest receptor.

4.3.5 Table 16 allocates appropriate character corrections.

Table 16. Allocation of Character Corrections

Measured Operation	Tonality Correction (dB)	Impulsivity Correction (dB)	Intermittency Correction (dB)	Other Sound Characteristics Correction (dB)
During Period 10:00 – 11:00	0	6	3	0
Highest Allocated Correction for Assessment Period	0	6	3	0
Total Overall Correction to be added to Specific Noise Level at Receptor	+9			

4.3.6 Table 17 completes the BS4142 Assessment.

Table 17. BS4142 Assessment

Receptor	Calculated Specific Noise Level (dB)	Total Overall Character Correction (dB)	Calculated Rated Level (dB)	Median (Typical) Background Sound Level $L_{A90,t}$ (dB)	Criteria* (dB)	Difference +/- (dB)
Eager Street	24.9	+9	33.9	44.0	39.0	-5.1

*Manchester City Council require the rated level of noise to be no greater than 5dB below background

4.3.7 Table 17 indicates that the rated level of noise falls below the criteria noise level imposed by Manchester City Council and so there is no requirement to consider noise mitigation measures.

4.3.8 Manchester City Council have requested that an assessment of maximum noise levels is included within the Assessment. Table 18 predicts the maximum noise level at the Receptor and compares the predicted noise level with the most applicable criteria.

Table 18. Maximum Noise Level Assessment

Receptor	Highest Measured Maximum Noise Level (dB)	Distance to Receptor (m)	Calculated Noise Level at Receptor (dB)	External Noise Criteria Level* (dB)	Difference +/- (dB)
Eager Street	100.8	86	52.1*	60	-7.9

*Includes 10dB barrier attenuation

4.3.9 Table 18 indicates that the maximum noise level falls below the external noise criteria limit presented in BS8233:2014. With a partially open window this external noise level will afford an approximate internal noise level of 37.1dB which falls below the internal noise criteria level of 45dB(A).

5 CONCLUSION

5.1.1 Professional Consult Limited was appointed by Paul McKenna to prepare a Noise Impact Assessment for the construction of a two-storey building to form 3 no. light industrial units (Class B1) on a currently vacant parcel of land off Reliance Street in Manchester M40 3AG.

5.1.2 Manchester City Council has granted planning permission (App. Ref.119669/FO/2018) for the above development subject to a number of conditions, with the following being applicable to noise:

‘Condition 7) Notwithstanding the details submitted, before any use hereby approved commences, the premises shall be acoustically insulated and treated to limit the break out of noise in accordance with a noise study of the premises and a scheme of acoustic treatment that has been submitted to and approved in writing by the City Council as local planning authority. The scheme shall be implemented in full before the use commences.

Condition 8) Prior to first use of the development any external equipment, insulation, Externally mounted ancillary plant, equipment and servicing shall be selected and/or acoustically treated in accordance with a scheme designed so as to achieve a rating level of 5dB (L_{Aeq}) below the typical background (L_{A90}) level at the nearest noise sensitive location. The scheme shall be submitted to and approved in writing by the City Council as local planning authority in order to secure a reduction in the level of noise emanating from the site.’

5.1.3 It is understood that there is to be no externally mounted plant and so Condition 8 can be discharged on the basis of the Condition not being applicable to this development.

5.1.4 Condition 7 relates to noise break-out from the proposed commercial units and so this Noise Impact Assessment is concerned with the potential noise impact from future operations, within the proposed commercial units, impacting upon the closest existing residential dwellings.

5.1.5 This Assessment has been undertaken to identify the key noise sources associated with the proposed operation and determine potential noise impacts at the closest noise sensitive receptors. Accordingly, this Assessment has been completed with due regard to the National Planning Policy Framework and its associated National Planning Policy Guidance and BS4142:2014+A1:2019. At the request of Manchester City Council, this Assessment has been updated to include a prediction of the maximum noise levels generated by the Site at the closest residential receptor which has shown compliance with the adopted noise criteria.

5.1.6 This Assessment has adopted worst-case calculations in order to ensure a robust approach in assessing the calculated noise levels predicted at the closest residential receptors to the Site. Nevertheless, this Assessment has shown that the rated level of noise generated by operation of the units at the closest receptors considered falls below the criteria noise level required by Manchester City Council.

5.1.7 In conclusion, the predicted noise levels at the identified receptors are sufficiently low enough to accord with the ‘No Observed Effect Level’ as detailed in the PPG.

APPENDIX 1: LIMITATIONS

This report and its findings should be considered in relation to the terms of reference and objectives agreed between Professional Consult Limited and the Client.

The executive summary, conclusions and recommendations sections of the report provide an overview and guidance only and should not be specifically relied upon without considering the context of the report in full.

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APPENDIX 2: GLOSSARY OF ACOUSTIC TERMINOLOGY

Noise is defined as unwanted sound. Human ears are able to respond to sound in the frequency range 20 Hz (deep bass) to 20,000 Hz (high treble) and over the audible range of 0 dB (the threshold of perception) to 140 dB (the threshold of pain). The ear does not respond equally to different frequencies of the same magnitude, but is more responsive to mid-frequencies than to lower or higher frequencies. To quantify noise in a manner that approximates the response of the human ear, a weighting mechanism is used. This reduces the importance of lower and higher frequencies, in a similar manner to the human ear.

Furthermore, the perception of noise may be determined by a number of other factors, which may not necessarily be acoustic. In general, the impact of noise depends upon its level, the margin by which it exceeds the background level, its character and its variation over a given period of time. In some cases, the time of day and other acoustic features such as tonality or impulsiveness may be important, as may the disposition of the affected individual. Any assessment of noise should give due consideration to all of these factors when assessing the significance of a noise source.

The most widely used weighting mechanism that best corresponds to the response of the human ear is the 'A'-weighting scale. This is widely used for environmental noise measurement, and the levels are denoted as dB(A) or L_{Aeq} , L_{A90} etc., according to the parameter being measured.

The decibel scale is logarithmic rather than linear, and hence a 3 dB increase in sound level represents a doubling of the sound energy present. Judgement of sound is subjective, but as a general guide a 10 dB(A) increase can be taken to represent a doubling of loudness, whilst an increase in the order of 3 dB(A) is generally regarded as the minimum difference needed to perceive a change under normal listening conditions.

An indication of the range of sound levels commonly found in the environment is given in the following table.

Table 1: Typical Sound Pressure Levels

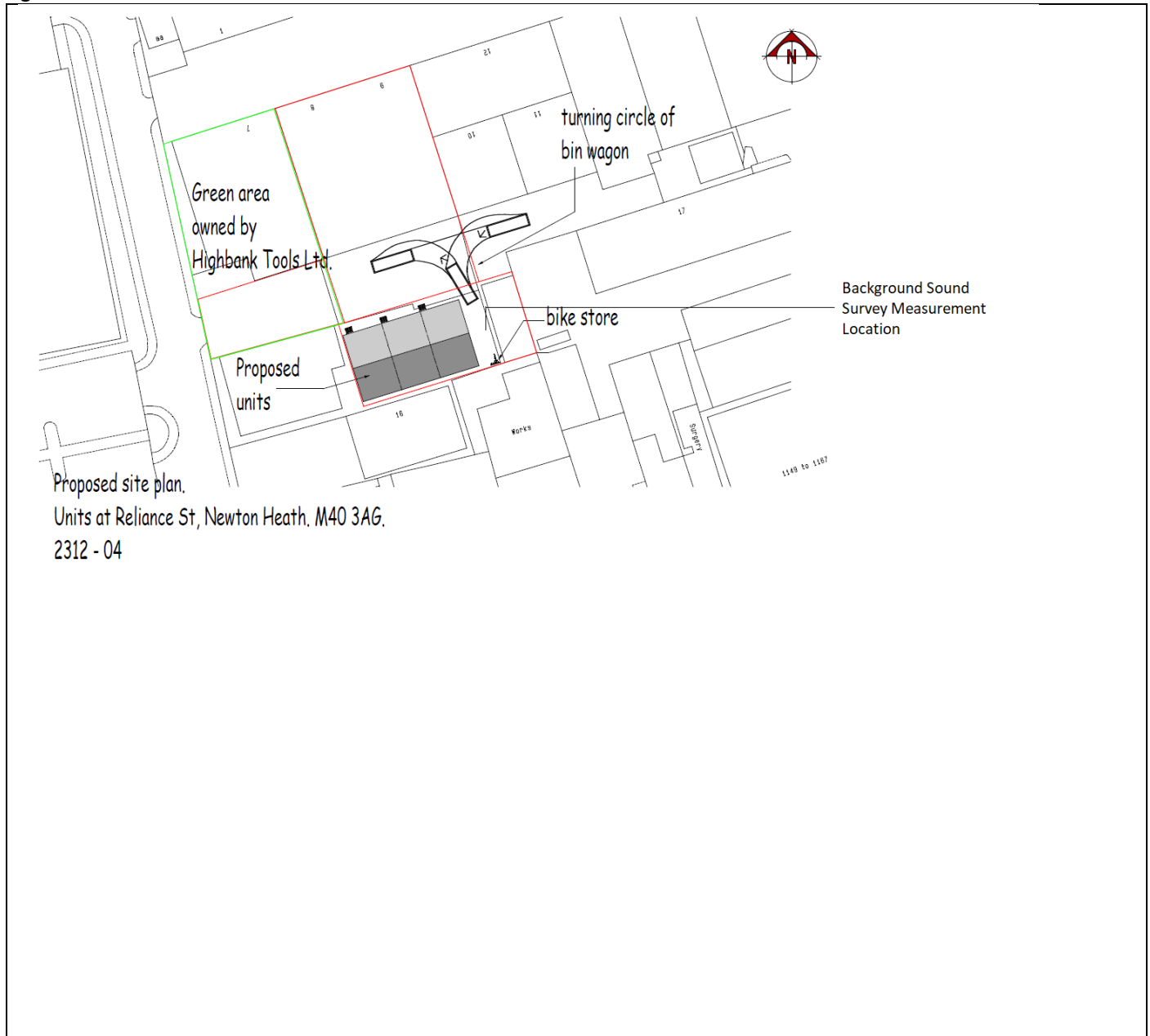
Sound Pressure Level (dB)	Location/Example
0	Threshold of hearing
20 - 30	Quiet bedroom at night
30 - 40	Living room during the day
40 - 50	Typical office
50 - 60	Inside a car
60 - 70	Typical high street
70 - 90	Inside factory
100 - 110	Burglar alarm at 1m away
110 - 130	Jet aircraft on take off
140	Threshold of pain

Table 2: Terminology

Descriptor	Explanation
dB (decibel)	The scale on which sound pressure level is expressed. It is defined as 20 times the logarithm of the ratio between the root-mean-square pressure of the sound field and a reference pressure (2x10 ⁻⁵ Pa).
dB(A)	A-weighted decibel. This is a measure of the overall level of sound across the audible spectrum with a frequency weighting (i.e. 'A' weighting) to compensate for the varying sensitivity of the human ear to sound at different frequencies.
L _{Aeq, T}	L _{Aeq} is defined as the notional steady sound level which, over a stated period of time (T), would contain the same amount of acoustical energy as the A - weighted fluctuating sound measured over that period.
L _{Amax}	L _{Amax} is the maximum A - weighted sound pressure level recorded over the period stated. L _{Amax} is sometimes used in assessing environmental noise where occasional loud noises occur, which may have little effect on the overall Leq noise level but will still affect the noise environment. Unless described otherwise, it is measured using the 'fast' sound level meter response.
L ₁₀ & L ₉₀	If a non-steady noise is to be described it is necessary to know both its level and the degree of fluctuation. The Ln indices are used for this purpose, and the term refers to the level exceeded for n% of the time. Hence L ₁₀ is the level exceeded for 10% of the time and as such can be regarded as the 'average maximum level'. Similarly, L ₉₀ is the 'average minimum level' and is often used to describe the background noise. It is common practice to use the L ₁₀ index to describe traffic noise.
Free-field Level	2A sound field determined at a point away from reflective surfaces other than the ground with no significant contributions due to sound from other reflective surfaces. Generally as measured outside and away from buildings.
Fast	A time weighting used in the root mean square section of a sound level meter with a 125millisecond time constant.
Slow	A time weighting used in the root mean square section of a sound level meter with a 1000millisecond time constant.

APPENDIX 3: SITE LOCATION PLAN & NOISE MEASUREMENT POSITION

Figure 1: Noise Measurement Position



APPENDIX 4: BACKGROUND SOUND MEASUREMENTS

Period start	Measured Ambient Noise Level, $L_{Aeq,t}$ (dB)	Measured Background Noise Level, $L_{A90,t}$ (dB)
04/07/2019 14:00	61.4	50.1
04/07/2019 14:30	52.5	49.7
04/07/2019 15:00	53.1	49.2
04/07/2019 15:30	52.6	49.4
04/07/2019 16:00	51.2	47.7
04/07/2019 16:30	51.3	47.8
04/07/2019 17:00	52.1	47.6
04/07/2019 17:30	51.8	47
04/07/2019 18:00	49.2	46.4
04/07/2019 18:30	49.6	46
04/07/2019 19:00	49	45.5
04/07/2019 19:30	48.5	45.5
04/07/2019 20:00	48.5	45.3
04/07/2019 20:30	47.4	43.4
04/07/2019 21:00	47.1	43.1
04/07/2019 21:30	46.1	42.4
04/07/2019 22:00	46.1	42.5
04/07/2019 22:30	49.4	42
04/07/2019 23:00	46.1	41.3
04/07/2019 23:30	45.2	40.5
05/07/2019 00:00	43.7	40.1
05/07/2019 00:30	43	39
05/07/2019 01:00	42.2	38.2
05/07/2019 01:30	41.4	38
05/07/2019 02:00	42.7	37.9
05/07/2019 02:30	41.7	37.6
05/07/2019 03:00	42.5	38.1
05/07/2019 03:30	42.1	37.1
05/07/2019 04:00	41.8	38
05/07/2019 04:30	43.2	38.5
05/07/2019 05:00	45.4	38.7
05/07/2019 05:30	46.8	41.6
05/07/2019 06:00	48.5	44
05/07/2019 06:30	49.6	45.9
05/07/2019 07:00	49.8	46.3
05/07/2019 07:30	62.6	48.4
05/07/2019 08:00	50.3	46
05/07/2019 08:30	55.4	46.9
05/07/2019 09:00	51.9	47.6
05/07/2019 09:30	60.6	50
05/07/2019 10:00	51.4	48.2
05/07/2019 10:30	50.9	48.1
05/07/2019 11:00	52.3	49.7

05/07/2019 11:30	52	48.2
05/07/2019 12:00	52.1	47.5
05/07/2019 12:30	52.3	47.5
05/07/2019 13:00	52.2	47.9
05/07/2019 13:30	52.8	49.7
05/07/2019 14:00	55	49.3
05/07/2019 14:30	53.1	48.4
05/07/2019 15:00	51.1	48.6
05/07/2019 15:30	54.8	47.7
05/07/2019 16:00	54.1	49.7
05/07/2019 16:30	53.2	47.9
05/07/2019 17:00	53.6	48.5
05/07/2019 17:30	51.4	48.2
05/07/2019 18:00	50.1	47.5
05/07/2019 18:30	52.7	48.7
05/07/2019 19:00	52.6	48.5
05/07/2019 19:30	51	46.8
05/07/2019 20:00	49.1	46
05/07/2019 20:30	50.2	45.1
05/07/2019 21:00	49	44.5
05/07/2019 21:30	47.2	43.9
05/07/2019 22:00	48.1	43.9
05/07/2019 22:30	51.4	44.4
05/07/2019 23:00	47	43.4
05/07/2019 23:30	46.4	42.4
06/07/2019 00:00	45.8	42.5
06/07/2019 00:30	45.3	42
06/07/2019 01:00	44.6	41.5
06/07/2019 01:30	43.4	39.9
06/07/2019 02:00	44.8	40.2
06/07/2019 02:30	44.2	40.5
06/07/2019 03:00	43.1	39.2
06/07/2019 03:30	43.7	39
06/07/2019 04:00	44.5	38.8
06/07/2019 04:30	43.1	38.6
06/07/2019 05:00	43.3	38.9
06/07/2019 05:30	45.8	41.3
06/07/2019 06:00	46.1	42.5
06/07/2019 06:30	46.9	43.2
06/07/2019 07:00	49.5	44.4
06/07/2019 07:30	48.7	44.1
06/07/2019 08:00	47.9	44.6
06/07/2019 08:30	57.5	45.5
06/07/2019 09:00	58.5	46.1
06/07/2019 09:30	49.6	46.5
06/07/2019 10:00	57.4	46.8
06/07/2019 10:30	55.9	46.6

06/07/2019 11:00	50.6	47.1
06/07/2019 11:30	50.6	47.1
06/07/2019 12:00	50.5	47
06/07/2019 12:30	51.7	47.6
06/07/2019 13:00	51.8	46.8
06/07/2019 13:30	49.5	46.5
06/07/2019 14:00	50.5	46.8
06/07/2019 14:30	50.4	46.9
06/07/2019 15:00	49.2	46.3
06/07/2019 15:30	49.7	46.3
06/07/2019 16:00	49.8	46.9
06/07/2019 16:30	48.8	45.7
06/07/2019 17:00	48	45.2
06/07/2019 17:30	50.3	45.1
06/07/2019 18:00	49.2	45.3
06/07/2019 18:30	48.6	45.3
06/07/2019 19:00	50.5	45.5
06/07/2019 19:30	48	43.9
06/07/2019 20:00	48.2	44.5
06/07/2019 20:30	50.6	44
06/07/2019 21:00	49.4	43
06/07/2019 21:30	47.9	43.6
06/07/2019 22:00	50.4	43.5
06/07/2019 22:30	47.9	44
06/07/2019 23:00	47.3	42.5
06/07/2019 23:30	46.5	42
07/07/2019 00:00	46.7	42.9
07/07/2019 00:30	46	41.9
07/07/2019 01:00	46.8	41.6
07/07/2019 01:30	45.6	41.6
07/07/2019 02:00	47	41.3
07/07/2019 02:30	45.6	40.6
07/07/2019 03:00	45.7	42.5
07/07/2019 03:30	45.6	42
07/07/2019 04:00	45.5	41.5
07/07/2019 04:30	44.5	39.7
07/07/2019 05:00	44.5	40.4
07/07/2019 05:30	45.2	41.2
07/07/2019 06:00	47.8	42.9
07/07/2019 06:30	46.6	41.9
07/07/2019 07:00	46.8	41.2
07/07/2019 07:30	46.5	40.8
07/07/2019 08:00	46	41.8
07/07/2019 08:30	46.5	42.1
07/07/2019 09:00	50.3	42.4
07/07/2019 09:30	47.3	43.2
07/07/2019 10:00	49.5	44.1

07/07/2019 10:30	49	45.1
07/07/2019 11:00	50.8	46.4
07/07/2019 11:30	50.2	45.6
07/07/2019 12:00	50.1	46
07/07/2019 12:30	51	45.9
07/07/2019 13:00	49.9	45.2
07/07/2019 13:30	49.5	45.4
07/07/2019 14:00	48.5	44.9
07/07/2019 14:30	49.6	45.8
07/07/2019 15:00	48.6	45.2
07/07/2019 15:30	48.5	45.1
07/07/2019 16:00	49.9	44.7
07/07/2019 16:30	48.8	44.2
07/07/2019 17:00	48.9	43.5
07/07/2019 17:30	47.9	44
07/07/2019 18:00	47.8	44
07/07/2019 18:30	47.2	43.5
07/07/2019 19:00	47.7	43.6
07/07/2019 19:30	49.4	43.1
07/07/2019 20:00	49.6	42.9
07/07/2019 20:30	49	46.1
07/07/2019 21:00	49	46.1
07/07/2019 21:30	48.5	45.8
07/07/2019 22:00	50.6	45.9
07/07/2019 22:30	48.6	45.8
07/07/2019 23:00	49	45.3
07/07/2019 23:30	48.4	44.2
08/07/2019 00:00	46.8	43
08/07/2019 00:30	46.3	43.1
08/07/2019 01:00	44.4	41.1
08/07/2019 01:30	51.2	39.8
08/07/2019 02:00	42.7	39
08/07/2019 02:30	41	37.2
08/07/2019 03:00	41.6	37.7
08/07/2019 03:30	43.3	39.4
08/07/2019 04:00	43.3	40
08/07/2019 04:30	43.9	40.8
08/07/2019 05:00	45.5	41.9
08/07/2019 05:30	48.3	45.3
08/07/2019 06:00	62.8	46
08/07/2019 06:30	50	46.9
08/07/2019 07:00	49.3	46.1
08/07/2019 07:30	50.7	46.8
08/07/2019 08:00	54.1	47
08/07/2019 08:30	53.6	47
08/07/2019 09:00	54.3	48.4
08/07/2019 09:30	53.2	48.6

Reference: 19.015.1.R2
Date: 20/01/2020
Project: Land off Reliance Street, Manchester

08/07/2019 10:00	52.7	47.5
08/07/2019 10:30	58.6	49.4

APPENDIX 5: MAXIMUM NOISE LEVELS – CAR REPAIR GARAGE

Period start	Measured Maximum Noise Level ($L_{Amax,fast}$)
26/06/19 08:04:03:000	93.3
26/06/19 08:05:03:000	74
26/06/19 08:06:03:000	70.9
26/06/19 08:07:03:000	79.1
26/06/19 08:08:03:000	92.6
26/06/19 08:09:03:000	87.2
26/06/19 08:10:03:000	71.5
26/06/19 08:11:03:000	72.9
26/06/19 08:12:03:000	80.9
26/06/19 08:13:03:000	71.5
26/06/19 08:14:03:000	76.9
26/06/19 08:15:03:000	85.8
26/06/19 08:16:03:000	88.1
26/06/19 08:17:03:000	71.5
26/06/19 08:18:03:000	66.2
26/06/19 08:19:03:000	72.5
26/06/19 08:20:03:000	76.4
26/06/19 08:21:03:000	68.2
26/06/19 08:22:03:000	72.5
26/06/19 08:23:03:000	77.5
26/06/19 08:24:03:000	71.9
26/06/19 08:25:03:000	67.6
26/06/19 08:26:03:000	60.3
26/06/19 08:27:03:000	73.6
26/06/19 08:28:03:000	60.9
26/06/19 08:29:03:000	63.4
26/06/19 08:30:03:000	62.2
26/06/19 08:31:03:000	55.8
26/06/19 08:32:03:000	60.2
26/06/19 08:33:03:000	65.1
26/06/19 08:34:03:000	57.6
26/06/19 08:35:03:000	60.6
26/06/19 08:36:03:000	66.2
26/06/19 08:37:03:000	63.8
26/06/19 08:38:03:000	67.1
26/06/19 08:39:03:000	68.7
26/06/19 08:40:03:000	70.6
26/06/19 08:41:03:000	64.6
26/06/19 08:42:03:000	68.5
26/06/19 08:43:03:000	75.1
26/06/19 08:44:03:000	75.1
26/06/19 08:45:03:000	85.6
26/06/19 08:46:03:000	64.9
26/06/19 08:47:03:000	97.7

26/06/19 08:48:03:000	89.4
26/06/19 08:49:03:000	73.8
26/06/19 08:50:03:000	86.9
26/06/19 08:51:03:000	90.6
26/06/19 08:52:03:000	69.3
26/06/19 08:53:03:000	94.5
26/06/19 08:54:03:000	70.5
26/06/19 08:55:03:000	87.4
26/06/19 08:56:03:000	67.3
26/06/19 08:57:03:000	89.4
26/06/19 08:58:03:000	79.2
26/06/19 08:59:03:000	90.9
26/06/19 09:00:03:000	75.6
26/06/19 09:01:03:000	73.4
26/06/19 09:02:03:000	67.3
26/06/19 09:03:03:000	84.6
26/06/19 09:04:03:000	79.3
26/06/19 09:05:03:000	85.4
26/06/19 09:06:03:000	72.6
26/06/19 09:07:03:000	72.2
26/06/19 09:08:03:000	67.7
26/06/19 09:09:03:000	73.1
26/06/19 09:10:03:000	71.3
26/06/19 09:11:03:000	66.5
26/06/19 09:12:03:000	74.6
26/06/19 09:13:03:000	73.5
26/06/19 09:14:03:000	66.8
26/06/19 09:15:03:000	64
26/06/19 09:16:03:000	66.4
26/06/19 09:17:03:000	62.6
26/06/19 09:18:03:000	73.5
26/06/19 09:19:03:000	87.1
26/06/19 09:20:03:000	86.9
26/06/19 09:21:03:000	75.4
26/06/19 09:22:03:000	69.9
26/06/19 09:23:03:000	73.5
26/06/19 09:24:03:000	73.7
26/06/19 09:25:03:000	71.7
26/06/19 09:26:03:000	62.4
26/06/19 09:27:03:000	66.2
26/06/19 09:28:03:000	67.7
26/06/19 09:29:03:000	77
26/06/19 09:30:03:000	67.8
26/06/19 09:31:03:000	63.2
26/06/19 09:32:03:000	64.2
26/06/19 09:33:03:000	65.7
26/06/19 09:34:03:000	68.4

26/06/19 09:35:03:000	67.4
26/06/19 09:36:03:000	64.1
26/06/19 09:37:03:000	70
26/06/19 09:38:03:000	69.8
26/06/19 09:39:03:000	67.2
26/06/19 09:40:03:000	84.3
26/06/19 09:41:03:000	91.4
26/06/19 09:42:03:000	83.6
26/06/19 09:43:03:000	81.5
26/06/19 09:44:03:000	57.1
26/06/19 09:45:03:000	67.2
26/06/19 09:46:03:000	78.8
26/06/19 09:47:03:000	77.5
26/06/19 09:48:03:000	73.8
26/06/19 09:49:03:000	76.4
26/06/19 09:50:03:000	74.5
26/06/19 09:51:03:000	69.7
26/06/19 09:52:03:000	81.2
26/06/19 09:53:03:000	72.4
26/06/19 09:54:03:000	85.6
26/06/19 09:55:03:000	75.5
26/06/19 09:56:03:000	74.5
26/06/19 09:57:03:000	72.6
26/06/19 09:58:03:000	69.3
26/06/19 09:59:03:000	79.3
26/06/19 10:00:03:000	70.8
26/06/19 10:01:03:000	77.5
26/06/19 10:02:03:000	72.5
26/06/19 10:03:03:000	76.9
26/06/19 10:04:03:000	81.4
26/06/19 10:05:03:000	67.8
26/06/19 10:06:03:000	93.1
26/06/19 10:07:03:000	69.9
26/06/19 10:08:03:000	70.6
26/06/19 10:09:03:000	69.2
26/06/19 10:10:03:000	72.1
26/06/19 10:11:03:000	77.8
26/06/19 10:12:03:000	69.7
26/06/19 10:13:03:000	74.6
26/06/19 10:14:03:000	67.5
26/06/19 10:15:03:000	95.1
26/06/19 10:16:03:000	88.5
26/06/19 10:17:03:000	77
26/06/19 10:18:03:000	89.7
26/06/19 10:19:03:000	74.1
26/06/19 10:20:03:000	61.3
26/06/19 10:21:03:000	79.2

26/06/19 10:22:03:000	89.9
26/06/19 10:23:03:000	87.1
26/06/19 10:24:03:000	69.2
26/06/19 10:25:03:000	64.8
26/06/19 10:26:03:000	64.2
26/06/19 10:27:03:000	63.8
26/06/19 10:28:03:000	61.1
26/06/19 10:29:03:000	69.9
26/06/19 10:30:03:000	66.5
26/06/19 10:31:03:000	85.7
26/06/19 10:32:03:000	88.7
26/06/19 10:33:03:000	90.5
26/06/19 10:34:03:000	100.8
26/06/19 10:35:03:000	94.9
26/06/19 10:36:03:000	81.3
26/06/19 10:37:03:000	99.3
26/06/19 10:38:03:000	72.5
26/06/19 10:39:03:000	89.7
26/06/19 10:40:03:000	88.1
26/06/19 10:41:03:000	98.2
26/06/19 10:42:03:000	70.4
26/06/19 10:43:03:000	83.4
26/06/19 10:44:03:000	73
26/06/19 10:45:03:000	80.8
26/06/19 10:46:03:000	72.7
26/06/19 10:47:03:000	64.9
26/06/19 10:48:03:000	69
26/06/19 10:49:03:000	73
26/06/19 10:50:03:000	75
26/06/19 10:51:03:000	76.5
26/06/19 10:52:03:000	78.1
26/06/19 10:53:03:000	76.1
26/06/19 10:54:03:000	76.4
26/06/19 10:55:03:000	73
26/06/19 10:56:03:000	70.2
26/06/19 10:57:03:000	76.9
26/06/19 10:58:03:000	74
26/06/19 10:59:03:000	82

APPENDIX 6: MAXIMUM NOISE LEVELS – JOINERY WORKSHOP

Period start	Measured Maximum Noise Level ($L_{Amax,fast}$)
08/07/19 11:02:21:000	76.1
08/07/19 11:03:21:000	63.5
08/07/19 11:04:21:000	63.3
08/07/19 11:05:21:000	63.1
08/07/19 11:06:21:000	63.5
08/07/19 11:07:21:000	63.4
08/07/19 11:08:21:000	63.1
08/07/19 11:09:21:000	63.1
08/07/19 11:10:21:000	62.9
08/07/19 11:11:21:000	70.7