

PEAK acoustics



Noise Impact Assessment

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Site:	Tam House, Brow Road, Huddersfield, HD1 4TP
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Executive Summary

A Noise Impact Assessment has been undertaken for the proposal of 6 no. new industrial units at Tam House, Brow Road, Huddersfield, HD1 4TP. The development permits the use of light industrial starter units.

Measurements of the prevailing background noise climate were undertaken from Monday 18th – Wednesday 20th October at a location representative of the identified Noise Sensitive Receptors (NSRs). Further comparative measurements were undertaken near to NSR's to identify any variance in background levels across site.

The nearest or most-affected Noise Sensitive Receptors (NSRs) were identified by the Local Authority as No. 47a, 49a, 53 – 55 Brow Road and 51 Hill Top Road. Reception points in calculations included ground floor receptor windows to reflect operational hours of the unit, during the daytime only.

Using the measured background noise survey data and statistical analysis, a representative daytime background sound level of 52 dB L_{A90} was derived for the assessment. As this background level is particularly high, the assessment is to achieve a level 5 dB below the representative background sound level to ensure background creep up is avoided.

As the future use of the site is unknown, a worst-case scenario of a car and van workshop using handheld tools was adopted to assess the potential impact on nearby receptors. It is likely that this type of use is unlikely to be present due to the limited space within the site courtyard and internal floor space of the units. However, is a good representation of the highest noise levels expected at site.

Specific Sound Levels have been calculated for the cumulative operation of all on site noise sources using industry standard acoustic modelling software 'SoundPLAN'. This software uses ISO-9613-2 - *Attenuation of sound during propagation outdoors*.

A BS4142 assessment of two scenarios has been conducted to include the use of units with all shutter doors open and all shutter doors closed. The assessment concluded that with shutter doors open, the worst affected receptor, No. 49a, is predicted at 10 dB above background, indicative of *Significant Adverse Impact*. The assessment of shutter doors closed concluded that at the worst affected receptor levels were predicted at 14 dB below background, indicative of a *Low Impact* in accordance with BS4142, corresponding to achievement of NOEL in the NPSE.

To ensure noise impact does not give rise to adverse complaint, all shutter doors must remain closed during loud periods of operation. Given this outcome is based on considerations for an absolute worst-case use for the unit and corresponding worst-case noise levels, any potential future use of the site is unlikely to cause detriment to the amenity of nearby occupiers.

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1. Introduction

- 1.1 A Noise Impact Assessment has been undertaken at Tam House, Brow Road, Huddersfield, HD1 4TP in relation to the proposal for erection of 6 new industrial units to be used for light industrial starter uses.
- 1.2 No activities shall take place at the premises, including deliveries to, or dispatches from the premises outside the hours of:
 - 07:30 – 18:30, Monday to Friday
 - 08:00 – 13:00, Saturday
 - No activity - Sunday or Bank Holidays
- 1.3 Due to the development being in early stages, details of potential noise sources have not yet been selected for the operational assessment. Therefore, Peak Acoustics will use representative noise data of the likely usage, considering a worst-case scenario of a car/van workshop whereby noise generated is high in sound pressure output due to the use of handheld machinery. The assessment will consider noise breakout and vehicular movements.
- 1.4 An assessment of the unit is to be undertaken to determine whether local residents are likely to suffer a loss of amenity as a result of noise from the site. Mitigation will be given should any potential loss of amenity be indicated.

2. Planning Policy & Guidance

- 2.1 The National Planning Policy Framework (NPPF) sets out the following aims in relation to the assessment of noise impact in the interest of sustainable development.
 - *"avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of a new development;*
 - *mitigate and reduce to a minimum other adverse impact on health and quality of life arising from noise from new development, including through the use of conditions;*
 - *recognise that development will often create some noise and existing businesses wanting to develop in continuance of their business should not have unreasonable restrictions put on them because of changes in nearby land uses since they were established; and*
 - *identify and protect areas of tranquillity which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason."*
- 2.2 To avoid and mitigate adverse noise effects on health arising from and impacting on new development, the NPPF makes reference to NPSE. The Noise Policy Statement for England (NPSE) was published in March 2010 and covers all forms of noise other than occupational noise. For the purposes of this report, "Neighbourhood Noise" is most relevant as NPSE defined at paragraph 2.5.

"neighbourhood noise which includes noise arising from within the community such as industrial and entertainment premises, trade and business premises, construction sites and noise in the street."

2.3 The Noise Policy Statement for England (NPSE) states the following aims in paragraph 2.2.

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.

SOAEL – Significant Observed Adverse Effect Level.

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

2.4 Kirklees Council requested that the assessment be undertaken in line with BS4142. Conditions 5 & 12 relate to noise and operational activity, detailed below.

“5. Prior to the hereby approved development being brought into use, a report specifying the measures to be taken to protect the occupants of nearby noise sensitive premises at 47a, 49a and 53-55 Brow Road Paddock HD1 4TP and 59 Hill Top Road Paddock HD1 4SQ from noise from the approved development shall be submitted to and approved in writing by the Local Planning Authority. The report shall include:

1) an assessment of noise emissions from the approved development.

2) details of background and predicted noise levels at the boundary of 47a, 49a and 53- 55 Brow Road Paddock HD1 4TP and 59 Hill Top Road Paddock HD1 4SQ.

3) a written scheme of how the occupants of 47a, 49a and 53-55 Brow Road Paddock HD1 4TP and 59 Hill Top Road Paddock HD1 4SQ will be protected from noise from the approved development with noise attenuation measures as appropriate. The development shall not be brought into use until all works comprised within the measures specified in the approved report have been carried out in full and such works shall be thereafter retained.

Reason: *In the interests of the protection of the amenity of nearby residential properties and to accord with Policies LP24 and 52 of the Kirklees Local Plan and Policies in Chapters 12 and 15 of the National Planning Policy Framework.*

12. *No activities shall be carried out on the premises, including deliveries to or dispatches from the premises, outside the hours of 0730 and 1830 Monday to Friday and 0800 to 1300 Saturdays. No activities shall take place on Sundays or Bank Holidays.*

Reason: *In the interests of the protection of the amenity of adjacent residential properties from the operation of the development and to accord with Policies LP24 and 52 of the Kirklees Local Plan and Policies in Chapters 12 and 15 of the National Planning Policy Framework”*

3. Assessment Criteria – BS4142

3.1 The common standard for the assessment of industrial and commercial sound is **‘BS4142 – Methods for rating and assessing industrial and commercial sound’**. The industrial noise assessment method in BS4142 is based on the difference between the measured ‘background sound level’ (L_{A90}), and the ‘Rating Level’ of the industrial source, at a noise sensitive location (NSR). BS4142:2014+A1:2019 states:

“The significance of sound of an industrial and/or commercial nature depends upon both the margin by which the rating level of the specific sound source exceeds the background sound level and the context in which the sound occurs.”

An estimation of the impact of the specific sound can be obtained by the difference of the rating sound level and the background sound level whilst considering the following:

“A Sound Rating Level at or below the background noise level is indicative of Low Impact;

A Sound Rating Level that exceeds the background noise level by around +5dB is likely an indication of Adverse Impact, depending on the context;

A Sound Rating Level that exceeds the background noise level by around +10dB is likely an indication of Significant Adverse Impact, depending on the context;”

BS4142 further states:

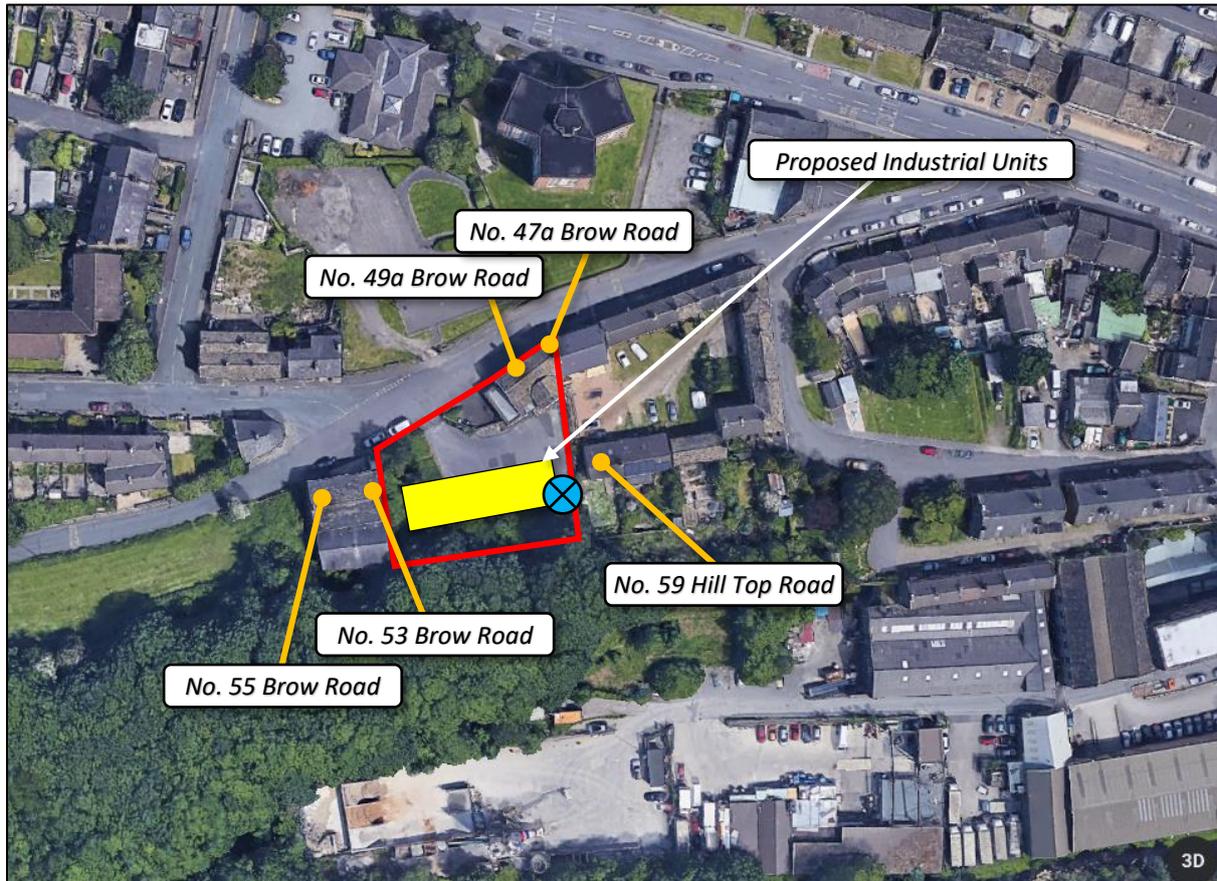
“The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound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

- 3.2 Achievement of a *Low Impact* in accordance with BS4142 can be deemed to correspond to ‘*NOEL – No Observed Effect Level*’ in the NPSE, as detailed above in Paragraph 2.3 above.

4. Site Location

- 4.1 The site is located on the westside of Huddersfield, between existing terrace housing. To the north lies some small commercial businesses and to the south is a number of medium to large industrial units. The site lies adjacent to Brow Road to the north, a lightly used road for access purposes. The site is surrounded by railway network lines stretching between Huddersfield Central to Lockwood, and Huddersfield Central to Slaithwaite.
- 4.2 The site, proposed noise source and receptor locations are shown in Figure 1 below:

Figure 1: Site, Source & NSR Locations - <https://earth.google.com>



-  Site Boundary (Approx.)
-  Noise Sensitive Receptors (NSRs)
-  Proposed Industrial Units Location (Approx.)
-  Background Monitoring Location M1 (Approx.)

5. Noise Sensitive Receptors

The nearest or most-affected Noise Sensitive Receptors (NSRs) have been identified as residential housing adjacent to the proposed units. Kirklees Council comments in Condition 5 of the Decision notice quote:

“2) details of background and predicted noise levels at the boundary of 47a,49a and 53-55 Brow Road Paddock HD1 4TP and 59 Hill Top Road Paddock HD1 4SQ. 3) a written scheme of how the occupants of 47a,49a and 53-55 Brow Road Paddock HD1 4TP and 59 Hill Top Road Paddock HD1 4SQ will be protected from noise from the approved development with noise attenuation measures as appropriate. The development shall not

be brought into use until all works comprised within the measures specified in the approved report have been carried out in full and such works shall be thereafter retained.”

- 5.1 The closest habitable room windows of these dwellings will be considered as specific reception points in calculations. As the business operates in daytime hours only, the assessment of night-time has not been considered within the report.
- 5.2 The NSR locations and reception points are shown in an aerial image (**Figure 1**) on Page 7.

6. Background Noise Survey

- 6.1 An unattended background noise survey was conducted at position M1 over a period of approximately 48 hours from Monday 18th – Wednesday 20th October 2021. Measurements of $L_{Aeq,T}$ and $L_{A90,T}$ were logged in 5-minute intervals in accordance with BS7445 - ‘*Description and Measurement of Environmental Noise*’.
- 6.2 At position M1 shown in Figure 1, the microphone was placed 1.8m from local ground level on a declining earth bund which lies between the proposed site and existing industrial sites to the south. Position M1 is located on the southern boundary to capture noise level emissions representative of housing rear gardens and receptor windows. The noise climate at this position was deemed representative of the noise climates at all surrounding receptors.
- 6.3 The noise climate at the monitoring position was dominated by birdsong, distant traffic and noise from nearby industrial sites towards the south. Due to surprisingly loud background noise, periods between 07:00 – 21:00 will be statistically analysed to minimise uncertainty and gain representative background sound levels during more sensitive time periods.
- 6.4 Measurements were obtained using Class 1 instrumentation. Full equipment details are given in **Appendix B**.
- 6.5 Equipment was calibrated before and after use and no significant drift occurred during measurements. Up to date calibration certification can be provided upon request. Full calibration details are provided in **Appendix D**.
- 6.6 Daytime temperatures during the survey were noted as between 13-14°C with wind speeds typically between 4 – 6 m/s; deemed suitable for conducting environmental noise monitoring. Detailed meteorological information can be found in **Appendix C**.

7. Background Sound Levels

7.1 The day and night-time background sound levels from measurement M1 are summarised below.

Measurement	Date(s)	Period	L _{Aeq,T}	L _{A90,T}
M1	Mon 18 th & Wed 20 th	Daytime (11:35 – 23:00 & 07:00 11:25)	56	53
	Mon 18 th – Tue 19 th	Night-time (23:00 – 07:00)	54	52
	Tuesday 19 th	Daytime (07:00 – 23:00)	59	55
	Tue 19 th – Wed 20 th	Night-time (23:00 – 07:00)	47	41

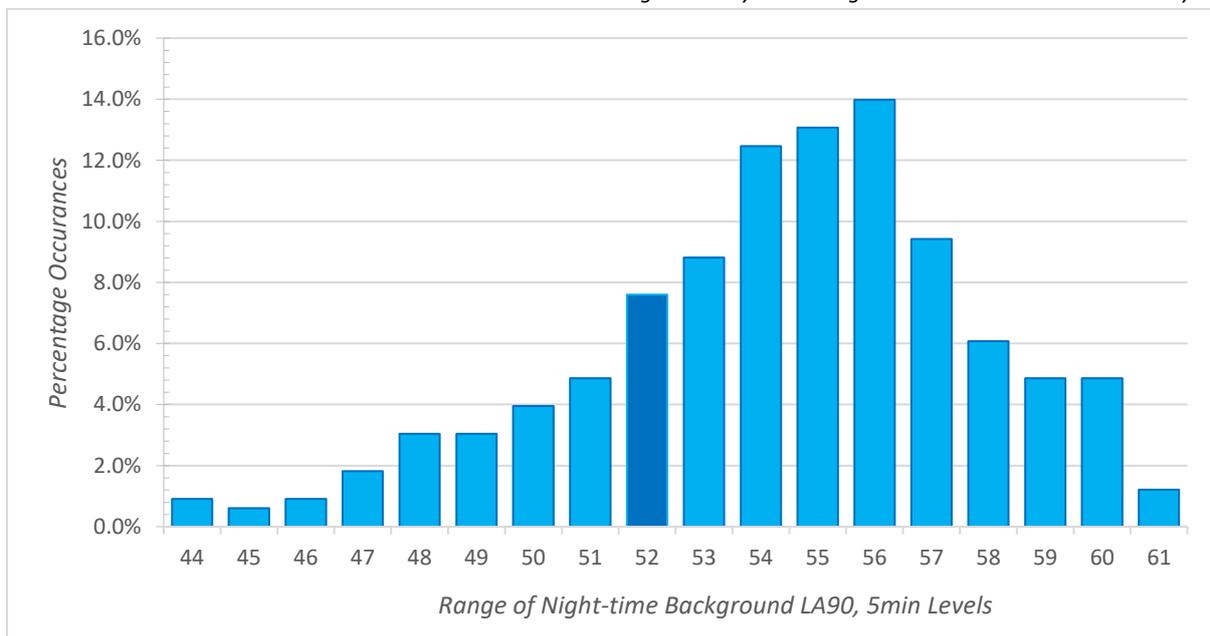
Table 1: Background Noise Survey Results

7.2 A full time history of the survey data is shown in **Appendix E**.

7.3 For the derivation of a representative daytime background sound level for the assessment, background sound level data from the measured period (07:00 – 21:00) on both days of the survey have been statistically analysed. Evening data has been considered for the residential receptors, accounting for the most sensitive time-period.

7.4 A graph of the statistical analysis is given below.

Figure 2: Daytime background sound level statistical analysis



7.5 From the statistical analysis, 52 dB L_{A90} has been selected as the representative background sound level for the BS4142 assessment. To ensure background creep up is minimised, the assessment of noise impact is to achieve a level 5 dB below the representative background sound level. Therefore, a level of **48 dB L_{A90}** is not to be exceeded at any receptor location.

8. Source Noise Levels

- 8.1 The future use or businesses are not yet known for the units and representative noise levels could not be measured or sourced. Instead, Peak Acoustic sources library noise data for a high sound pressure level output to best represent a worst-case scenario. In practice, levels are likely to be much lower than that used within the report.
- 8.2 It was communicated by the client that very light uses are proposed for the units. Peak Acoustics uses library noise data of a car/van workshop whereby the use of hand tools and equipment were present. Further noise sources included van manoeuvres to represent any drop off/delivery. Peak Acoustic library data has been used for these sources.
- 8.3 Details of the Lp levels are tabulated below:

Source	Para.	63	125	250	500	1k	2k	4k	dBA
Diesel Car/Van	L _p	87	79	73	72	73	68	62	76
Car/Van Workshop	L _{AE}	57	58	60	63	66	66	68	73

Table 2: Predicted Site Noise Levels

9. Building Sound Insulation

- 9.1 The latest floor plans show a separate area for storage and office space, located at basement level. To ensure noise breakout is considered from the weakest façade element, a transmissive area has been modelled into the design to account for the 'shutter door opening' within the building façade. A low assumption of 1mm corrugated steel has been included within the assessment.
- 9.2 The noise impact assessment considers predicted impacts with the shutter doors both open and closed. Below is the sound reduction index for 1mm corrugated steel.

	Sound Reduction Index (SRI)							R _w
	63	125	250	500	1k	2k	4k	
Shutter Door	11	14	16	20	25	29	23	25

Table 3: Building Sound Insulation

BS4142 Assessment – Shutter Doors Open

10. Specific Sound Levels – Shutter Doors Open

10.1 The Specific Sound Level is denoted L_{As} and is the A-weighted, equivalent noise level at the NSR locations. Specific Sound Levels have been calculated for the cumulative operation of all on site noise sources using industry standard acoustic modelling software ‘SoundPLAN’. This software uses ISO-9613-2 - *Attenuation of sound during propagation outdoors* and the model takes into account the following key factors:

- *Geometric divergence of sound*
- *Atmospheric absorption of sound*
- *Ground absorption*
- *A light downwind correction toward the NSRs*
- *Surrounding structures and objects which may reflect or block sound toward the NSRs*
- *The height of the NSRs (Ground Floor/Frist Floor receptor points; daytime relaxing)*

10.2 The Specific Sound Levels (L_{As}) have been calculated to the receptor locations shown in Figure 1 and described in Section 5. The Specific Sound Levels are tabulated below.

Location	Specific Sound Level, dB L_{As}
No. 47a Brow Road	53
No. 49a Brow Road	56
No. 53 Brow Road	45
No. 55 Brow Road	42
No. 51 Hill Top Road (receptor window)	44
No. 51 Hill Top Road (garden)	37

Table 4: Specific Sound Levels

10.3 The noise model input parameters were as follows:

Parameter	Input
Reflection Order	3
Ground Absorption Factor	G = 1
Air pressure	1013.3 mbar
Relative Humidity	70.0 %
Temperature	10.0°C

Table 5: Calculation Input Parameters

10.4 A noise map showing external sound propagation is shown in **Appendix F**.

11. Rating Levels

- 11.1 In accordance with BS4142, the Specific Sound Levels may be corrected for characteristics that make the sound more noticeable at the NSR location such as tonality, impulsivity and intermittency. Section 9.2 of BS4142 gives commentary on these characteristics and appropriate penalties:

“Tonality

For sound ranging from not tonal to prominently tonal the Joint Nordic Method gives a correction of between 0 dB and +6 dB for tonality. Subjectively, this can be converted to a penalty of 2 dB for a tone which is just perceptible at the noise receptor, 4 dB where it is clearly perceptible, and 6 dB where it is highly perceptible.

Impulsivity

A correction of up to +9 dB can be applied for sound that is highly impulsive, considering both the rapidity of the change in sound level and the overall change in sound level. Subjectively, this can be converted to a penalty of 3 dB for impulsivity which is just perceptible at the noise receptor, 6 dB where it is clearly perceptible, and 9 dB where it is highly perceptible.

Other sound characteristics

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.

NOTE 2 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.”

- 11.2 It is unclear as to what type of penalty may be applied for the type of noise emitted. However, to provide a robust assessment of operations a precautionary +6dB penalty has been applied to account for potential noise characteristics. The resultant Rating Levels are summarised below:

Location	Specific Sound Level, dB L _{As}	Total BS4142 Character Corrections	Rating Level, dB L _{Ar}
No. 47a Brow Road	53	+ 6	59
No. 49a Brow Road	56	+ 6	62
No. 53 Brow Road	45	+ 6	51
No. 55 Brow Road	42	+ 6	48
No. 51 Hill Top Road (receptor window)	44	+ 6	50
No. 51 Hill Top Road (garden)	37	+ 6	43

Table 6: Rating Levels

12. Rating Levels Vs Background

12.1 The Rating Levels are to be compared to the representative background sound level to determine the noise impact in accordance with BS4142.

A Sound Rating Level at or below the background noise level is indicative of Low Impact;

A Sound Rating Level that exceeds the background noise level by around +5dB is likely an indication of Adverse Impact, depending on the context;

A Sound Rating Level that exceeds the background noise level by around +10dB is likely an indication of Significant Adverse Impact, depending on the context;

12.2 The indicated noise impact at the identified Noise Sensitive Receptors is summarised below:

Location	Rating Level, dB L _{Ar}	Background Sound Level, dB L _{A90}	Difference, dB	Noise Impact
No. 47a Brow Road	59	48	11	Significantly Adverse
No. 49a Brow Road	62	48	14	Significantly Adverse
No. 53 Brow Road	51	48	3	Low/Adverse Impact
No. 55 Brow Road	48	48	0	Low Impact
No. 51 Hill Top Road (receptor window)	50	48	2	Low/Adverse Impact
No. 51 Hill Top Road (garden)	43	48	- 5	Low Impact

Table 7: Noise Impact

12.3 The noise impact at No.47a &No.49a indicate *Significant Adverse Impact* in accordance with BS4142, with the worst affected receptor predicted at 14 dB above the target criterion of 48 dB L_{A90}. Mitigation is required to ensure a *Low Impact* is achievable at all NSR locations.

12.4 A secondary assessment has been conducted to show the impact with all shutter doors closed during the operational periods, detailed in Section 13.

BS4142 Assessment – Shutter Doors Closed

13. Specific Sound Levels – Shutter Doors Closed

- 13.1 All parameters reflect that which is set out in Sections 10, 11 & 12. Sections 13, 14 & 15 have been condensed, as shown below.
- 13.2 The Specific Sound Levels (L_{As}) have been calculated to the receptor locations shown in Figure 1 and described in Section 5. The Specific Sound Levels are tabulated below.

Location	Specific Sound Level, dB L_{As}
No. 47a Brow Road	29
No. 49a Brow Road	32
No. 53 Brow Road	22
No. 55 Brow Road	18
No. 51 Hill Top Road (receptor window)	20
No. 51 Hill Top Road (garden)	14

Table 4: Specific Sound Levels

- 13.3 A noise map showing external sound propagation is shown in **Appendix F**.

14. Rating Levels

- 14.1 In accordance with BS4142, the Specific Sound Levels may be corrected for characteristics that make the sound more noticeable at the NSR location such as tonality, impulsivity and intermittency.
- 14.2 To provide a robust assessment of operations a precautionary +6dB penalty has been applied to account for potential noise characteristics. The resultant Rating Levels are summarised below:

Location	Specific Sound Level, dB L_{As}	Total BS4142 Character Corrections	Rating Level, dB L_{Ar}
No. 47a Brow Road	29	+ 6	35
No. 49a Brow Road	32	+ 6	38
No. 53 Brow Road	22	+ 6	28
No. 55 Brow Road	18	+ 6	24
No. 51 Hill Top Road (receptor window)	20	+ 6	26
No. 51 Hill Top Road (garden)	14	+ 6	20

Table 6: Rating Levels

15. Rating Levels Vs Background

- 15.1 The Rating Levels are to be compared to the representative background sound level to determine the noise impact in accordance with BS4142.
- 15.2 The indicated noise impact at the identified Noise Sensitive Receptors is summarised below:

Location	Rating Level, dB L _{ar}	Background Sound Level, dB L _{A90}	Difference, dB	Noise Impact
No. 47a Brow Road	35	48	- 13	Low Impact
No. 49a Brow Road	38	48	- 10	Low Impact
No. 53 Brow Road	28	48	- 20	Low Impact
No. 55 Brow Road	24	48	- 24	Low Impact
No. 51 Hill Top Road (receptor window)	26	48	- 22	Low Impact
No. 51 Hill Top Road (garden)	20	48	- 28	Low Impact

Table 7: Noise Impact

- 15.3 All receptor positions are indicative of a *Low Impact* in accordance with BS4142, corresponding to achievement of NOEL in the NPSE.
- 15.4 To ensure a *Low Impact* is achievable, all shutter doors must remain closed throughout loud operational processes. It is important to note that the assessment considers a worst-case level of use throughout all 6 units of a car/van workshop. In practice it is unlikely that all 6 units will include loud machinery/tools and therefore accounts for the worst-cased and unlikely scenario.

16. Conclusion

- 15.1 A noise impact assessment has been undertaken at Tam House, Brow Road, Huddersfield, HD1 4TP in relation to the proposal for erection of 6 no. new industrial units.
- 16.2 Measurements of the background noise climate were undertaken from Monday 18th – Wednesday 20th October 2021 at a position deemed representative of the identified Noise Sensitive Receptors (NSRs).
- 15.3 The nearest or most-affected Noise Sensitive Receptors were identified as No. 47a, 49a, 53 – 55 Brow Road and 51 Hill Top Road.
- 15.4 As the future use of the site is unknown, a worst-case scenario was adopted to assess the potential impact on nearby receptors.
- 16.5 Rating Levels from a potential worst-case use of the units with all shutter doors open indicated to be above the representative background sound level at four of the nearby receptors, indicating between *Significant – Adverse Impact*.

- 16.6 Rating levels from a potential worst-case use of the units with all shutter doors closed indicated to be below the representative background sound level at all nearby receptors, indicating a *Low Impact* in accordance with BS4142, corresponding to NOEL in the NPSE.
- 16.7 To ensure a Low impact is achievable, all shutter doors must remained closed throughout loud operations. No mitigation to the building elements or surrounding landscape is deemed necessary so long as the advice within this report is followed and implemented throughout the life of the development.

17. Uncertainty

- 17.1 The background monitoring equipment is subject to a 1dB error margin, however calibration before and after measurements allows the drift within the margin to be monitored and thus demonstrates that minimal drift occurred throughout the measurements.
- 17.2 Uncertainty can arise in the prediction of noise propagation from and around flat reflective surfaces, such as the surrounding structures present on site. This has been reduced to a minimum by utilising an acoustic modelling software that uses the validated method, ISO-9613-2, as described in BS4142.
- 17.3 Uncertainty in the calculated rating levels is further reduced by considering the worst-case and unlikely scenario of a car/van workshop in all 6 units.

APPENDIX A – Measurement Details

Measurement	Kit	Start Date	Start Time	End Date	End Time
M1	A1	13/10/21	11:35	14/10/21	11:20

APPENDIX B - Equipment Details

Kit	Equipment	Make	Model	Class	Serial Number
A1	Sound Meter	Svantek	958	1	34525
A1	Pre-Amp	Svantek	SV12L	1	32484
A1	Microphone	Microtech Gefell	MK255	1	11561
A1	Calibrator	Svantek	SV33A	1	90273

APPENDIX C - Meteorology Details

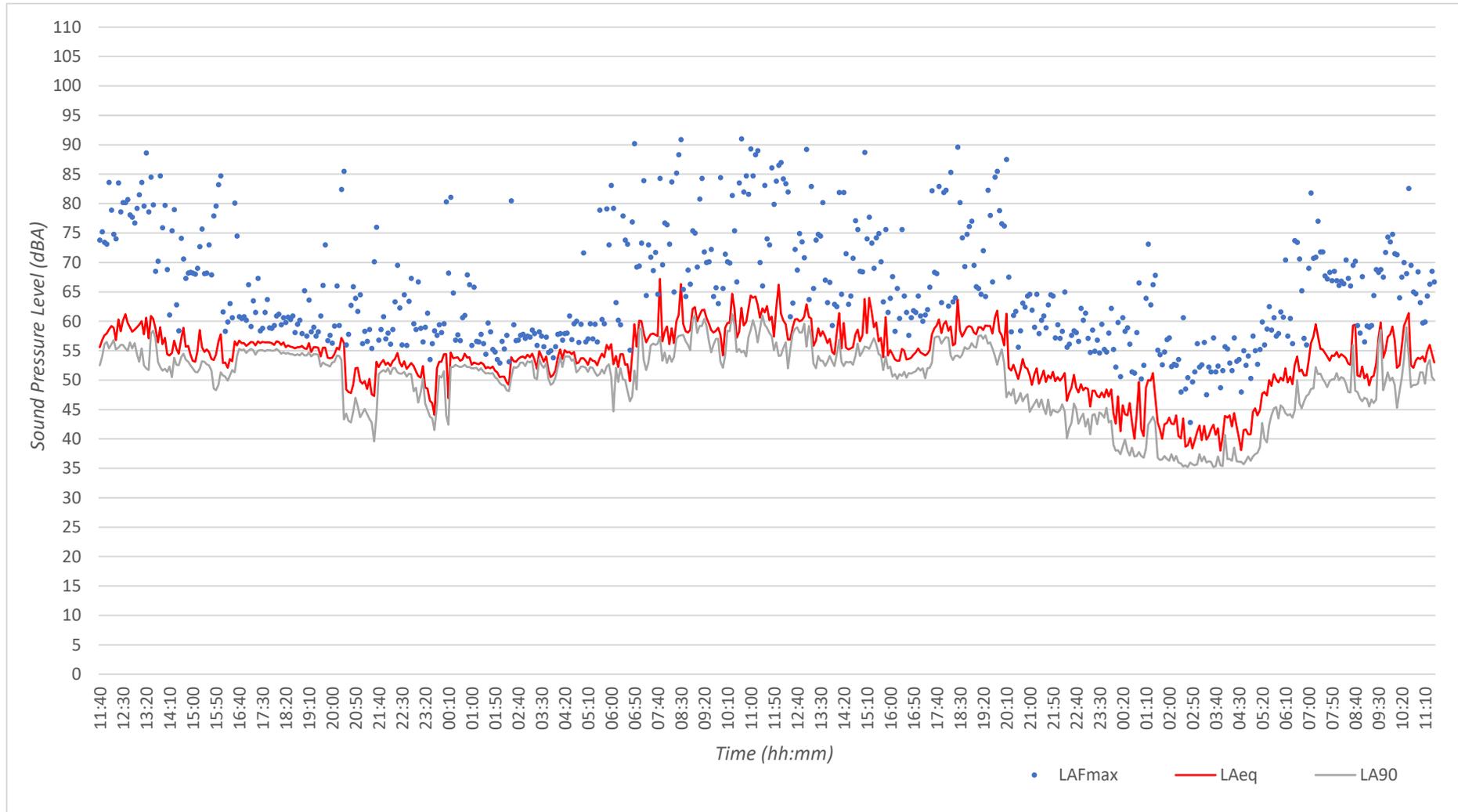
Date	Temp C°	Wind Speed m/s	Wind Direction	Humidity %	Precipitation mm	Cloud Cover (Oktas)
13/10/21	14	4 – 5	W	83	0	7/8
14/10/21	13	5 – 6	WSW	79	0	8/8

APPENDIX D - Calibration Details

Measurement	Calibrator Ref Level (dB)	Deviation Before (dB)	Deviation After (dB)
M1	114.0	0.3	-0.1

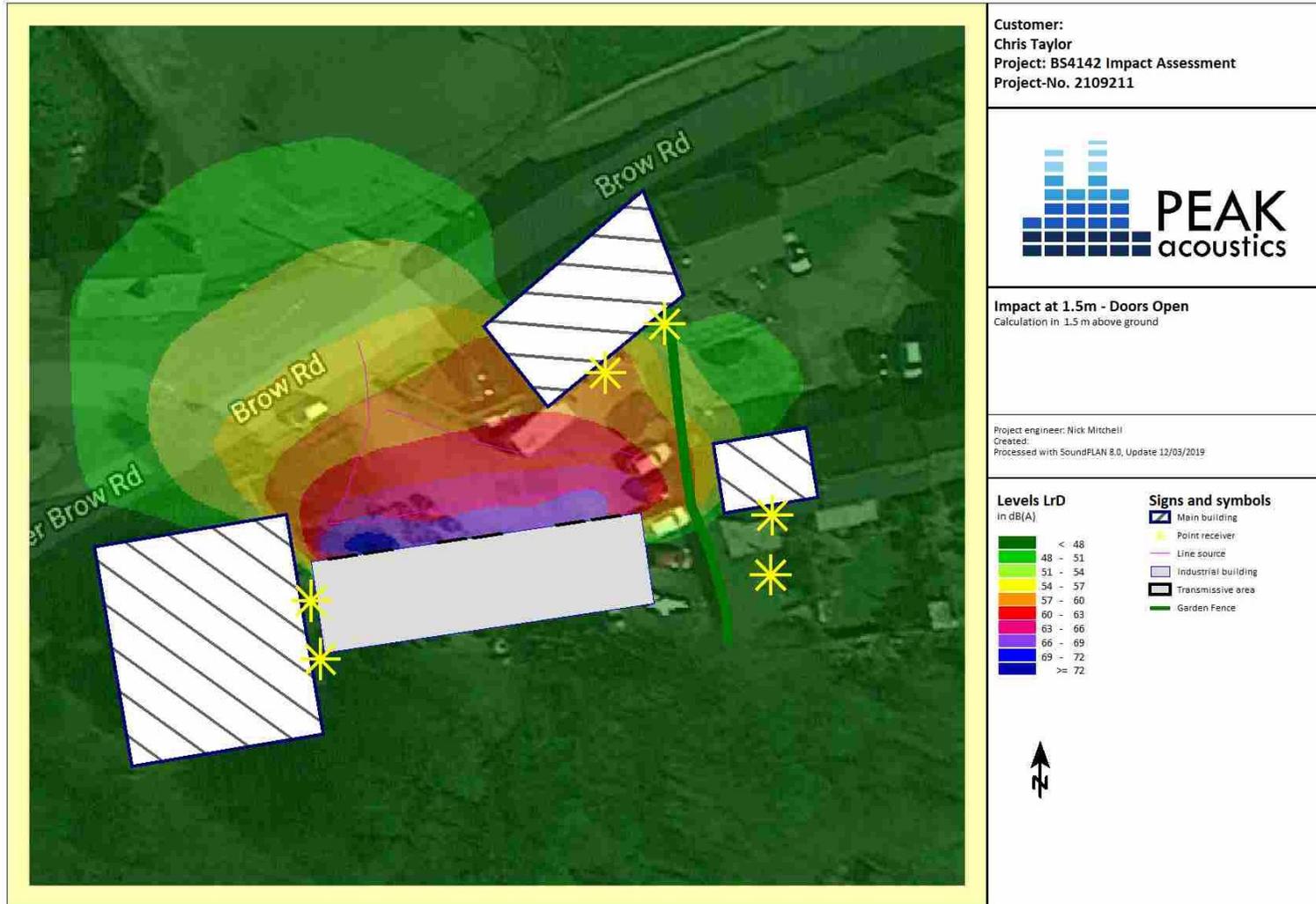
APPENDIX E – Noise Survey Results

Measured Background Sound Levels Time History (M1): 18th – 20th October 2021



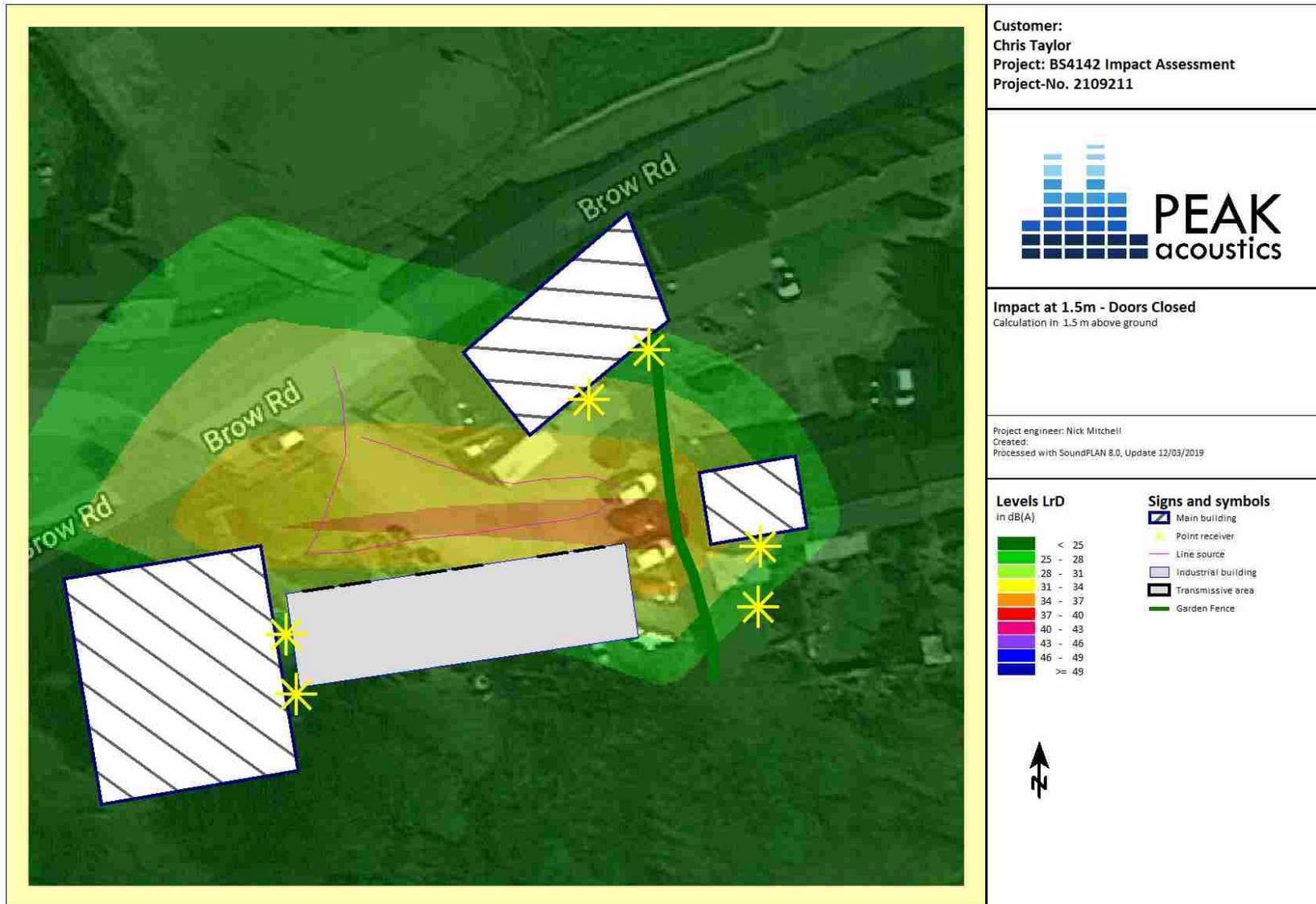
APPENDIX F – Grid Noise Maps & 3D Models

Noise Impact Assessment – Doors Open

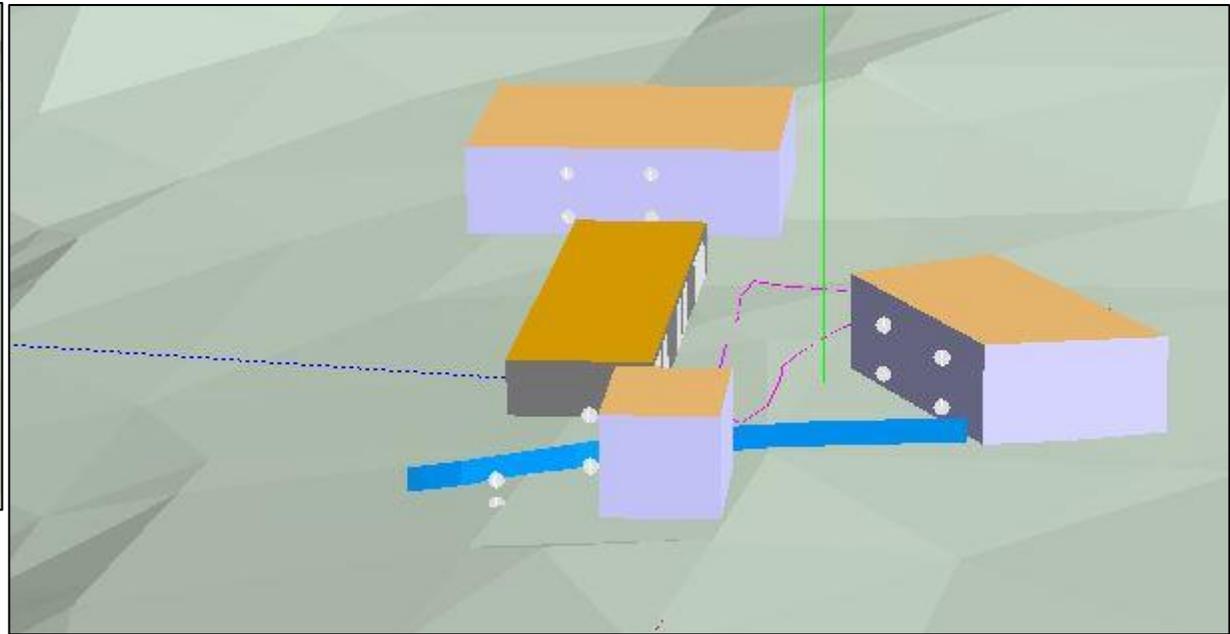
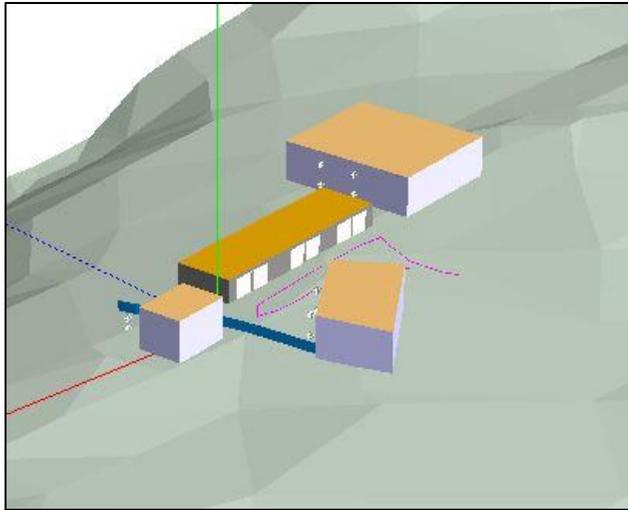


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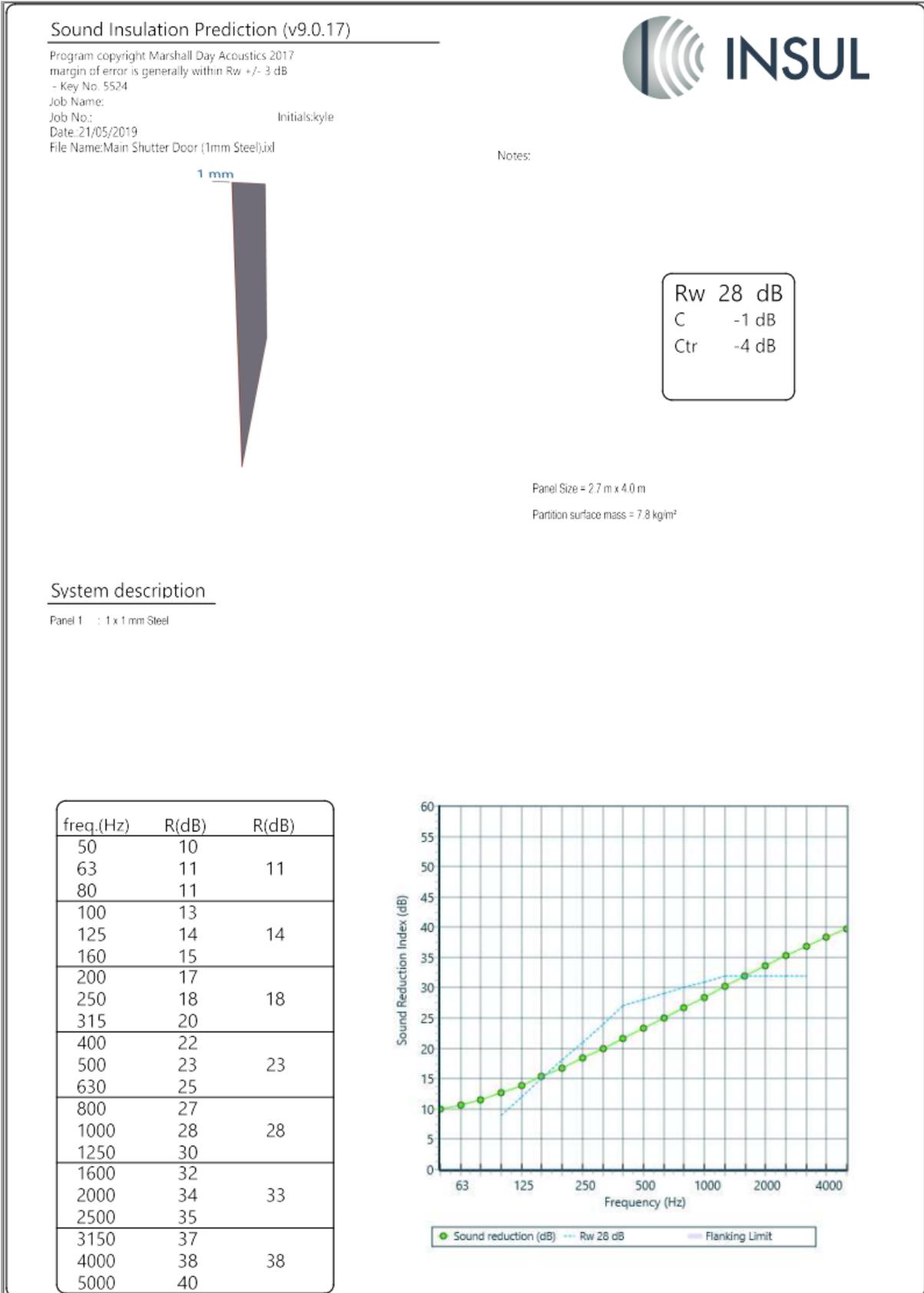
Noise Impact Assessment – Doors Closed



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APPENDIX G – Acoustic Modelling



APPENDIX H – Acoustic Terminology

To aid the understanding of acoustic terminology and the relative difference between noise levels the following background information is provided.

We perceive sound when the ear detects fluctuations in air pressure (sound waves), which are then processed by the brain and perceived as sound. Humans can hear an incredibly wide range of sound intensities ranging from jet engines to fingertips lightly brushing against each other. This range is quantified using a logarithmic scale called the decibel scale (dB). The comfortable range of the decibel scale typically ranges from 0dB (the threshold of hearing) to around 140dB. Here are some examples common environments and their typical noise levels.

Noise Level	Environment
0 dB(A)	Threshold of hearing
20 to 30 dB(A)	Quiet bedroom at night
30 to 40 dB(A)	Living room during the day
40 to 50 dB(A)	Typical office
50 to 60 dB(A)	Inside a moving car
60 to 70 dB(A)	Typical high street
100 to 110 dB(A)	Fire alarm at 1 metre away
140 dB(A)	Threshold of pain

Terminology

dB (decibel) – A unit used to quantify the pressure level of sound. Defined as 20 times the logarithm of the ratio between the root-mean-square pressure of a given sound field and a reference pressure level (2×10^{-5} Pa – threshold of hearing).

$L_{Aeq, T}$ – The equivalent continuous sound pressure level over a stated period. It quantifies a fluctuating sound level over a given period as the equivalent continuous sound level in which the same amount of acoustic energy is contained over. This is A-weighted in order to assess human perception.

L_{A90} – The sound level exceeded 90% of the time. Typically used to describe background noise the L_{90} is regarded as the ‘average minimum level’ and quantifies the common sound level of a fluctuation sound field i.e. the sound level that occurs 90% of the time. Alternatively, L_{10} describes the sound level exceeded 10% of the time and therefore quantifies the ‘average maximum level’ of sound which is often used during the calculation of road traffic noise.

A-Weighting – A standard weighting of the audible frequencies designed to reflect the response of the human ear to noise.

R_w – The Weighted Sound Reduction Index (R_w) is a number used to rate the effectiveness of a soundproofing system or material.



Let us introduce ourselves

Peak Acoustics formed in 2011, we are a fully accredited specialist consultancy and testing organisation.

We are a diverse team of Acoustic Consultants, Specialist Engineers and Building Compliance Technicians, with a network spanning the UK. We are proud to offer our services nationally, with no job too big or small.

We provide Acoustic Consultancy, Building Compliance Testing and Energy Services.

Additional Services

We offer an extensive range of services in the sectors of Acoustic Consultancy, Building Compliance & Energy Efficiency. We are able to put together custom packages combining multiple services which saves both time and money for you.

Building Compliance

- Sound Insulation Testing
- Air Tightness Testing
- Ventilation Testing
- Water Efficiency Calculations
- Sound Insulation Specification

Energy Efficiency

- SAP Calculations
- EPC's
- SBEM Calculations
- Energy Statements
- Sustainability Statements
- MEES Regulations
- Commercial EPC's

Acoustic Consultancy

- Noise Assessment for planning conditions
- Construction site noise monitoring
- Noise at work assessments
- Noise & Vibration Impact Assessments

Peace of mind

We are accredited and registered by all the relevant major UK authorities to provide the services we offer. Peak Acoustics is UKAS accredited for sound insulation testing, ATTMA registered for Air Leakage Testing, and our Energy team are all Domestic On-Completion Energy Assessors.

Our Added Value

We combine our detailed knowledge of building regulations with our technical understanding of building physics, acoustics and environmental sciences to maximise development quality. Our work ensures appropriate strategies and studies are prepared to demonstrate to local authorities how proposed developments will be of high quality and generate acceptable impact on the surrounding environment.

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