



Noise Impact Assessment

Client: Lighthouse Architecture

Site: 56 King Street, South Shields, NE33 1HZ

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Executive Summary

A Noise Impact Assessment has been undertaken at 56 King Street, South Shields, NE33 1HZ in relation to the proposed kitchen extract system arrangement serving the ground floor takeaway unit.

Based on the information available, the BS 4142:2014+A1:2019 Initial Impact Assessment of the unsilenced system predicts a rating level of 74 dB LAr at the nearest receptor, which is 36 dB above the adopted background sound level of 38 dB LA90. In BS 4142 terms, this indicates the potential for a significant adverse impact.

The contextual assessment also indicates that the unsilenced system would give rise to noise levels that are not considered appropriate for the nearest residential receptor.

To achieve an acceptable acoustic outcome, mitigation is required in the form of silencing between the fan and ductwork termination to achieve a rating level no greater than 38 dB LAr at the nearest noise-sensitive receptor window.

Subject to the implementation of suitable mitigation and confirmation of the final system noise data, it is considered that a low-impact outcome could be achieved in accordance with BS 4142:2014+A1:2019, consistent with the aim of avoiding significant adverse effects on health and quality of life as set out within the Noise Policy Statement for England.

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1. Introduction

Overview

A Noise Impact Assessment has been undertaken at 56 King Street, South Shields in relation to a proposed kitchen extract system serving the ground floor takeaway unit.

The system incorporates a fan unit mounted internally with ductwork termination just above 2nd floor level at the rear of the site.

Manufacturer technical data sheets with noise level data for the system components have been sourced and are given in **Appendix G**.

The system is associated with the ground floor kitchen of the takeaway business at the site.

An assessment of the proposed kitchen extract system arrangement has been undertaken to determine whether nearby residents are likely to suffer a loss of amenity as a result of noise.

Scope & Objectives

The scope of the noise assessment can be summarised as follows:

- Baseline sound monitoring survey to evaluate the prevailing background sound levels at the Noise Sensitive Receptor ('NSR') in accordance with BS7445 - *'Description and Measurement of Environmental Noise'*;
- Detailed sound modelling, acoustic calculations and analysis to predict sound levels at the NSR using industry-standard acoustic modelling software 'SoundPLAN'. This software uses ISO-9613-2 - *Attenuation of sound during propagation outdoors*;
- A contextual assessment for the suitability of the site, in accordance with relevant standards in respect of sound from the proposed sources; and
- Recommendation of mitigation measures where necessary, to comply with the requirements of the National Planning Policy Framework (2024), Noise Policy for England (2010) and British Standard BS 4142:2014+A1:2019 – Methods for rating and assessing industrial and commercial sound.
- No specific local policy guidance or consultee comments have been made available for this assessment.
- Further information on the legislation can be found in **Appendix I**.

2. Environmental Noise Survey

Measurement Methodology

A site visit was undertaken on 17 March 2026 to inspect the site and surrounding acoustic environment. During the visit, attended short-term noise measurements of LAeq,T and LA90,T were undertaken to the rear of the site in 5-minute intervals over a period of approximately one hour. The measurement location (M1) was positioned at ground-floor level to the rear of the site at a height of approximately 2 metres. The short-term survey was used to inform the understanding of the local noise climate; however, as the proposed extract system may operate until 23:00, the attended survey data was not considered sufficient on its own to derive a representative background sound level for the full assessment period. Accordingly, the BS 4142 assessment has been based on a background sound level obtained from noise data for a nearby reference site approximately 70 m to the southwest of the application site, sourced from the planning portal and considered representative of the application site.

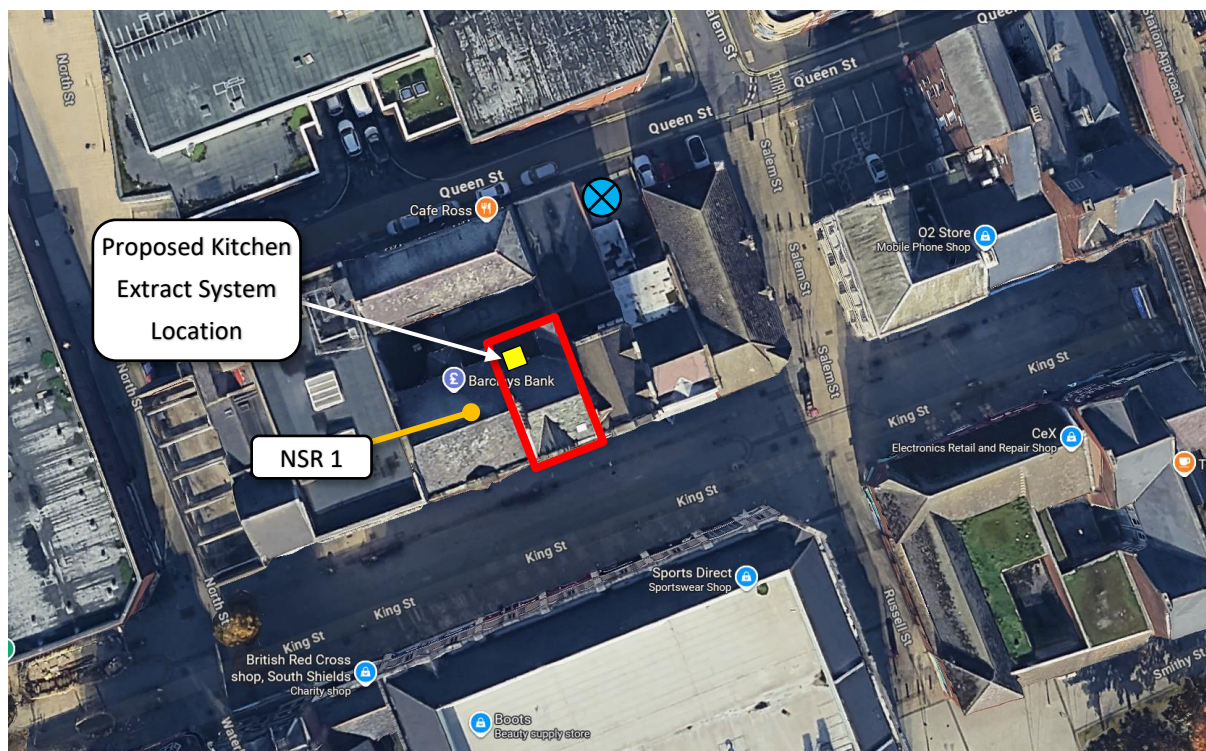


Figure 1: Site, Source & NSR Locations - <https://google.co.uk/maps>

- | | | | |
|---|--------------------------------|---|-----------------------------------|
|  | Site Boundary |  | Proposed Kitchen Extract Location |
|  | Noise Sensitive Receptor (NSR) |  | Attended Survey Location M1 |

Site Description

The site is located on King Street in South Shields, with its frontage facing a pedestrianised high street. The site and adjoining properties comprise commercial retail units at ground-floor level, with a mix of commercial and residential uses at upper-floor level. To the rear, the site faces an enclosed courtyard that is overlooked by windows serving the surrounding properties.

Context and Subjective Noise Climate

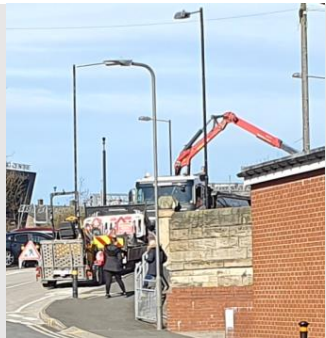
Noise Source	Description	Operation	Photo
Road	Cars and vans passing the rear of the site	Intermittent	
Construction Noise	Power saw in use on nearby site	Intermittent	
A/C Units	A/C Units on rear wall of adjacent building	Constant	
Plant Room	Neighbouring bank premises, large plant room vent	Constant	

Table 1: Subjective Summary of Noise Sources

Non-Representative Noise Sources

During the survey, no noise events occurred which would be deemed as atypical of the site location.

Noise Sensitive Receptors

The nearest and most-affected Noise Sensitive Receptor (NSR) was identified as the first and second floor windows of 58 King Street. These will be considered as specific reception points in calculations.

3. Environmental Noise Survey Results

Measurement Results

The kitchen extract system is intended to serve the ground-floor takeaway unit and therefore has the potential to operate until 23:00. A short attended measurement survey was undertaken at the rear of the site during the site visit; however, a representative background sound level for the assessment period was adopted from noise data obtained at a nearby reference site. For the purposes of this assessment, a background sound level of 38 dB LA90 has therefore been adopted.

4. BS4142:2014 Initial Impact Assessment

Noise Modelling

External sound propagation from the site has been calculated 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:

- *Aerial Imagery & Terrain Data sourced from Google Maps/Elevations*
- *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 (i.e., First/second-floor reception point)*
- *Operational schedule of equipment*

The following input parameters were used in the noise model:

Parameter	Input
Reflection Order	3
Ground Absorption Factors	G = 0.3 (Hard Ground)
Air pressure	1013.3 mbar
Relative Humidity	70.0 %
Temperature	10.0°C

Table 2: Calculation Input Parameters

Source Noise Levels

Details of the proposed kitchen extract system arrangement have been provided by the applicant. The assessed arrangement includes a Woods 45 Maxfan Compac, and the client has advised silencers will be incorporated within the system although the specifications are not yet known.

The assessment has been undertaken on the basis of the system without silencing to determine the level received at the NSR and if necessary determine the required silencer performance.

The proposed system arrangement is understood to include 3m of ductwork between the fan and ductwork termination, including a single 90° bend.

Manufacturer technical data sheets with noise level data were sourced and are given in **Appendix G**.

The calculated ductwork termination output is provided below:

Unit	Para.	63	125	250	500	1k	2k	4k	8k	dBA
Woods 45 Maxfan Compac Outlet	L _w	93	89	98	99	95	94	90	87	104

Table 3: Kitchen Extract System Noise Level

Details of the noise sources that have been modelled in 'SoundPLAN' are given below.

Source No.	Source	Parameter	Noise Level, dBA	Height above Ground (m)
1	Ductwork Termination	L _{WA}	99	7.4

Table 4: Modelled Source Noise Levels

To account for a worst-case scenario, the source will be modelled to be running at 100% during the daytime period (12pm – 11pm).

The noise model does not account for minor landscape features such as low garden walls and fences.

Specific Sound Levels

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 from the noise model and the levels at the worst affected floors of receptors are given below.

Location	Specific Sound Level, dB L _{As}
NSR 1 (2F)	74

Table 5: Specific Sound Levels

Rating Levels

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 BS4142:2014 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."

Noise from the kitchen extract system is not considered to be tonal, impulsive or intermittent sufficient to warrant a rating penalty.

The resultant Rating Levels are summarised below:

Location	Specific Sound Level, dB L_{As}	Total BS4142 Character Corrections	Rating Level, dB L_{Ar}
NSR 1	74	0	74

Table 6: Rating Levels

Rating Levels Vs Background

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;

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
NSR 1	74	38	+36	Significant adverse

Table 7: Noise Impact

The noise impact of the unsilenced system at the identified receptor is indicative of a significant adverse impact in accordance with BS4142 criteria.

5. BS4142:2014 Contextual Assessment

Aspects of absolute level

Absolute levels on site with the system operational have been calculated in 'SoundPLAN' to be 74 dBA (this is exclusive of any rating penalties), at NSR 1. This is significantly higher than the assessment background level.

With context, it is possible that the system will run continuously throughout the daytime period although at times of low demand the system may run at a low setting or be switched off.

The calculated absolute sound level is considered appropriate for a worst-case assessment; however, in practice, sound levels on site may at times be lower than those modelled.

Aspects of character

Noise output by the system is assumed to be broadband in nature, with no tonal element and no impulsive or intermittent characteristics. The system provides removal of hot air and odours from the ground floor unit and so may operate in response to demand.

Aspects of the receptor

The NSR is considered to be influenced by surrounding road traffic and existing plant sources within the locality.

Taking guidance from BS8233:2014 for external amenity spaces, a desirable guideline of 50 dB L_{Aeq,16hr} and an acceptable guideline of 55 dB L_{Aeq,16hr} for noisier environments is deemed appropriate. Calculations from the Initial Impact Assessment give specific noise levels at the NSRs in excess of the acceptable guideline.

Guidance is also taken from 'Appendix C' of the 'Acoustics Ventilation And Overheating: Residential Design Guide–January 2020' to specify an outside-to-inside level difference of approximately 13 dB through an open window. When this is applied to the predicted daytime levels at the NSR location, internal levels within the dwellings would be well above the guideline values.

Contextual recommendations

Following analysis of the existing site context and the assessed extract arrangement, mitigation is considered necessary in order to achieve a low-impact outcome in accordance with BS 4142:2014+A1:2019.

6. Mitigation

The preliminary system design indicates that silencers will be incorporated between the fan and ductwork termination. To achieve a rating level of 38 dB L_{Ar} at the nearest noise-sensitive receptor window, the silencer between the fan and termination would need to provide a 36 dB reduction in noise output relative to the unsilenced arrangement.

The noise model has been updated to incorporate a mitigated arrangement including a silencer providing 36 dB R_w reduction and the following noise impact is calculated:

Location	Rating Level, dB L _{Ar}	Background Sound Level, dB L _{A90}	Difference, dB	Noise Impact
NSR 1	38	38	0	Low

Table 8: Mitigated Noise Impact

7. Conclusion

A Noise Impact Assessment has been undertaken at 56 King Street, South Shields, NE33 1HZ in relation to the proposed kitchen extract system arrangement serving the ground floor takeaway unit.

Based on the information available, the BS 4142:2014+A1:2019 Initial Impact Assessment of the unsilenced system predicts a rating level of 74 dB L_{Ar} at the nearest receptor, which is 36 dB above the adopted background sound level of 38 dB L_{A90}. In BS 4142 terms, this indicates the potential for a significant adverse impact.

The contextual assessment also indicates that the unsilenced system would give rise to noise levels that are not considered appropriate for the nearest residential receptor.

To achieve an acceptable acoustic outcome, mitigation is required in the form of silencing between the fan and ductwork termination to achieve a rating level no greater than 38 dB L_{Ar} at the nearest noise-sensitive receptor window.

Subject to the implementation of suitable mitigation and confirmation of the final system noise data, it is considered that a low-impact outcome could be achieved in accordance with BS 4142:2014+A1:2019, consistent with the aim of avoiding significant adverse effects on health and quality of life as set out within the Noise Policy Statement for England.

8. Uncertainty

Short-term attended measurements were undertaken at the application site during the site visit. However, the representative background sound level adopted for the BS 4142 assessment has been taken from a nearby reference site, as this was considered more appropriate for the proposed hours of operation. As with any assessment that relies on reference-site background data, some uncertainty remains as to the exact correspondence between locations, although the sites are considered sufficiently comparable for the purposes of a robust assessment.

APPENDIX A - Measurement Details

Measurement	Kit	Start Date	Start Time	End Date	End Time
M1	4	17/03/2026	12:20	17/03/2026	13:15

Table 9: Measurement Dates

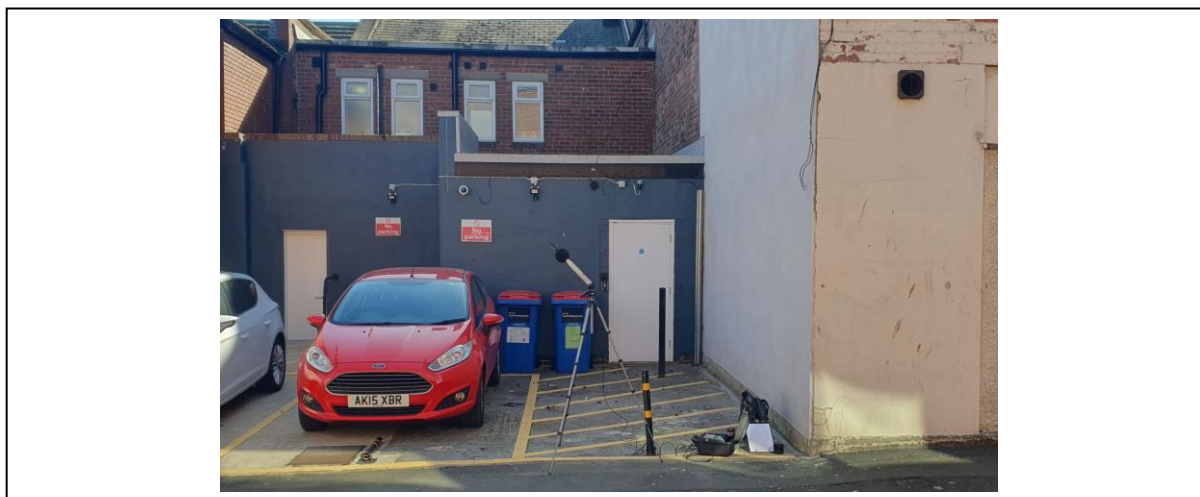


Figure 2: Site Location Measurement Pictures

APPENDIX B - Equipment Details

Kit	Equipment	Make	Model	Class	Serial Number
4	Sound Meter	SvanteK	977	1	45376
	Pre-Amp	SvanteK	SV12L	1	42561
	Microphone	ACO	7052E	1	59964
	Calibrator	SvanteK	SV33	1	90107

Table 10: Measurement Equipment Details

APPENDIX C - Calibration Details

Measurement	Calibrator Ref Level (dB)	Deviation Before (dB)	Deviation After (dB)
M1	113.60	0.31	0.40

Table 11: Calibration Details

APPENDIX D - Meteorology Details

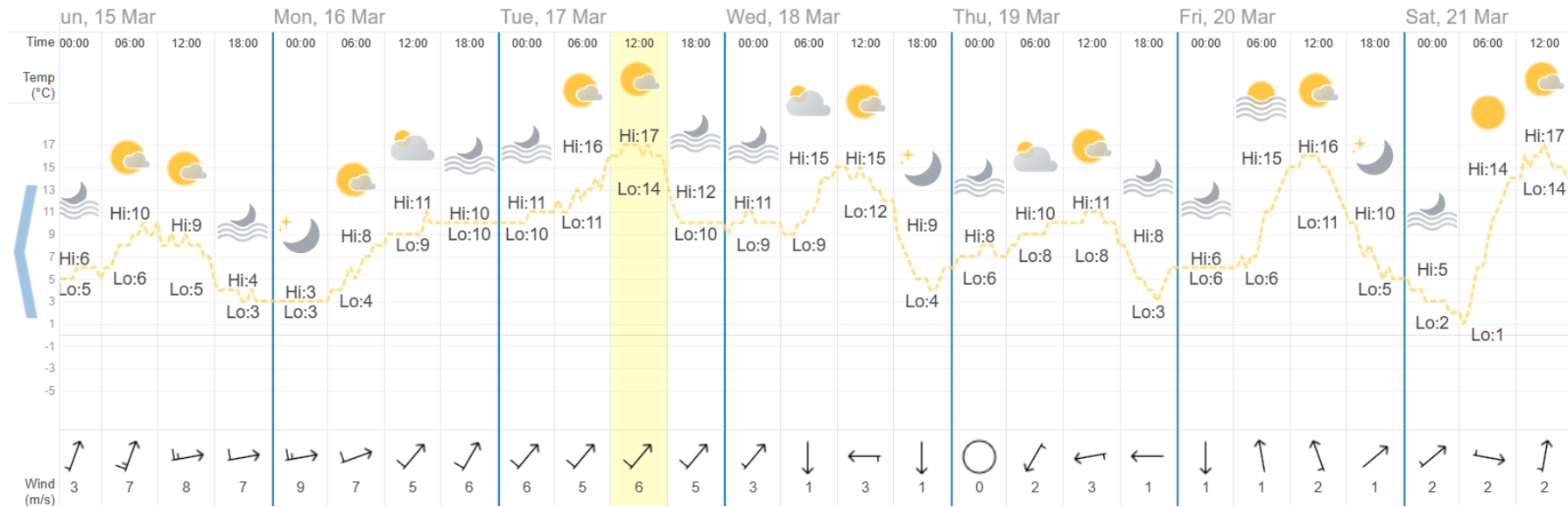


Figure 3: Meteorology Data - <https://www.timeanddate.com/weather>

APPENDIX E - Noise Survey Results

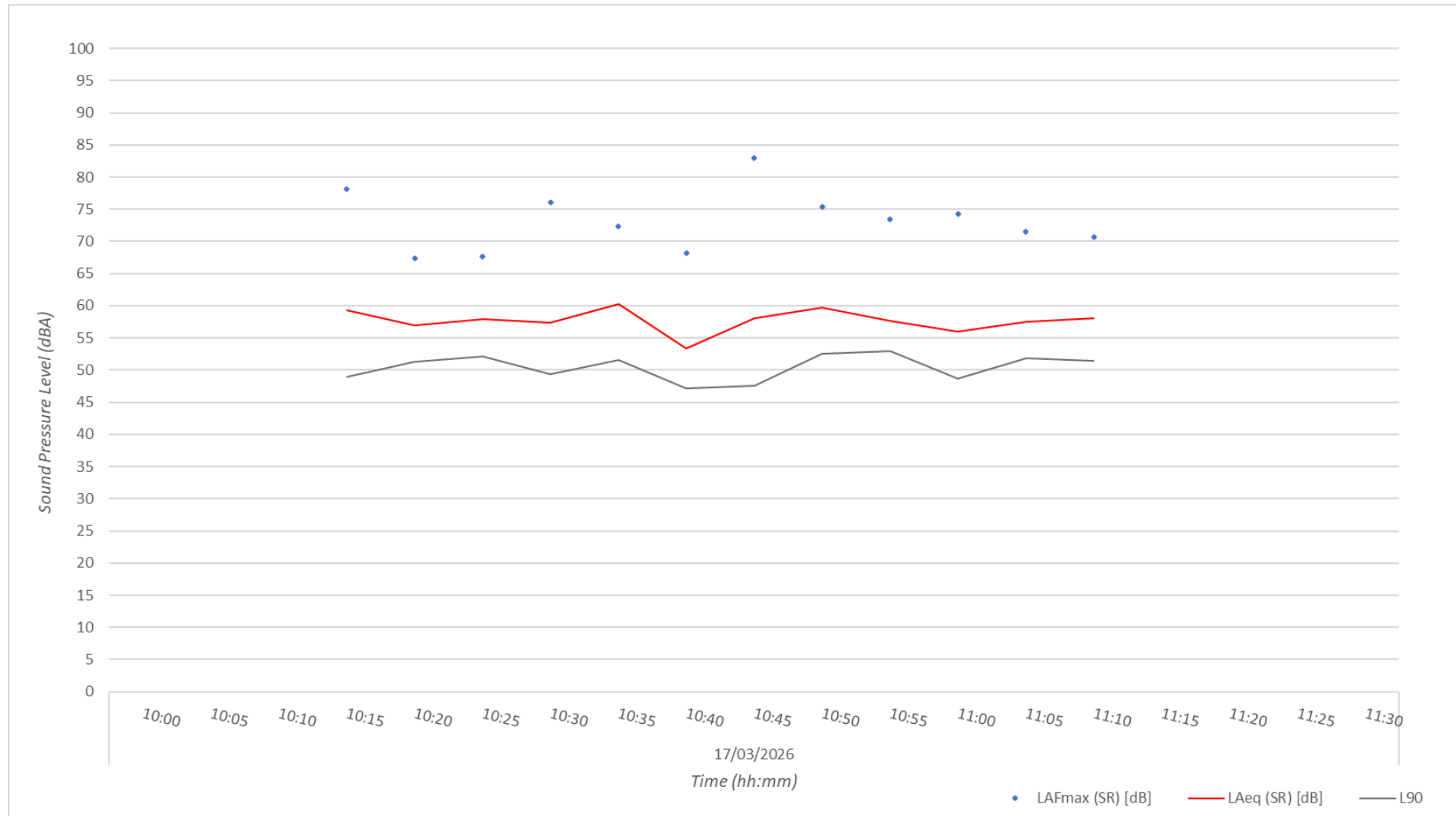


Figure 4: Measured Ambient Sound Level Time History (M1): 17/03/2026

APPENDIX F - Noise Maps

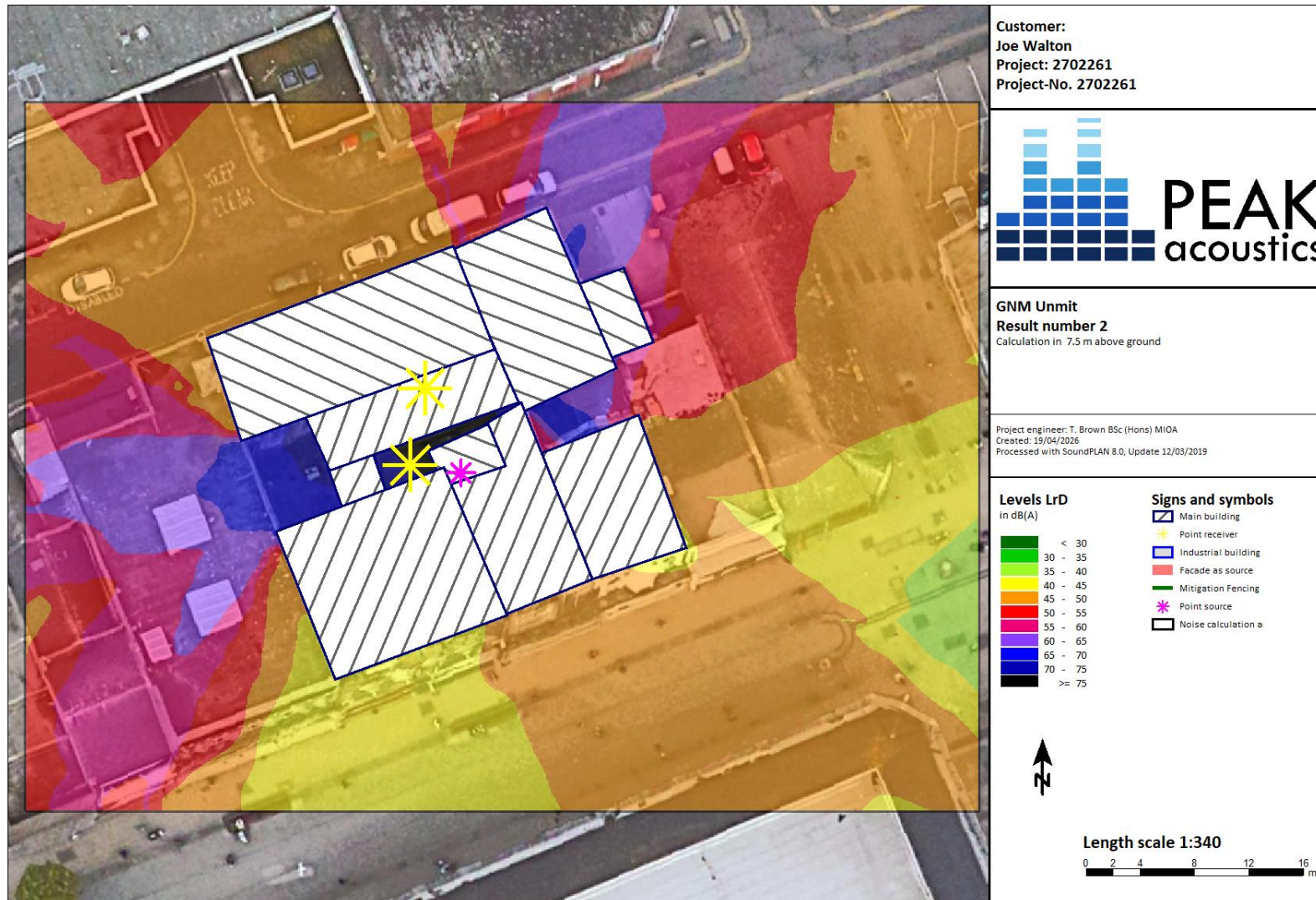


Figure 5: 2D Grid Noise Map of daytime Initial Impact Assessment

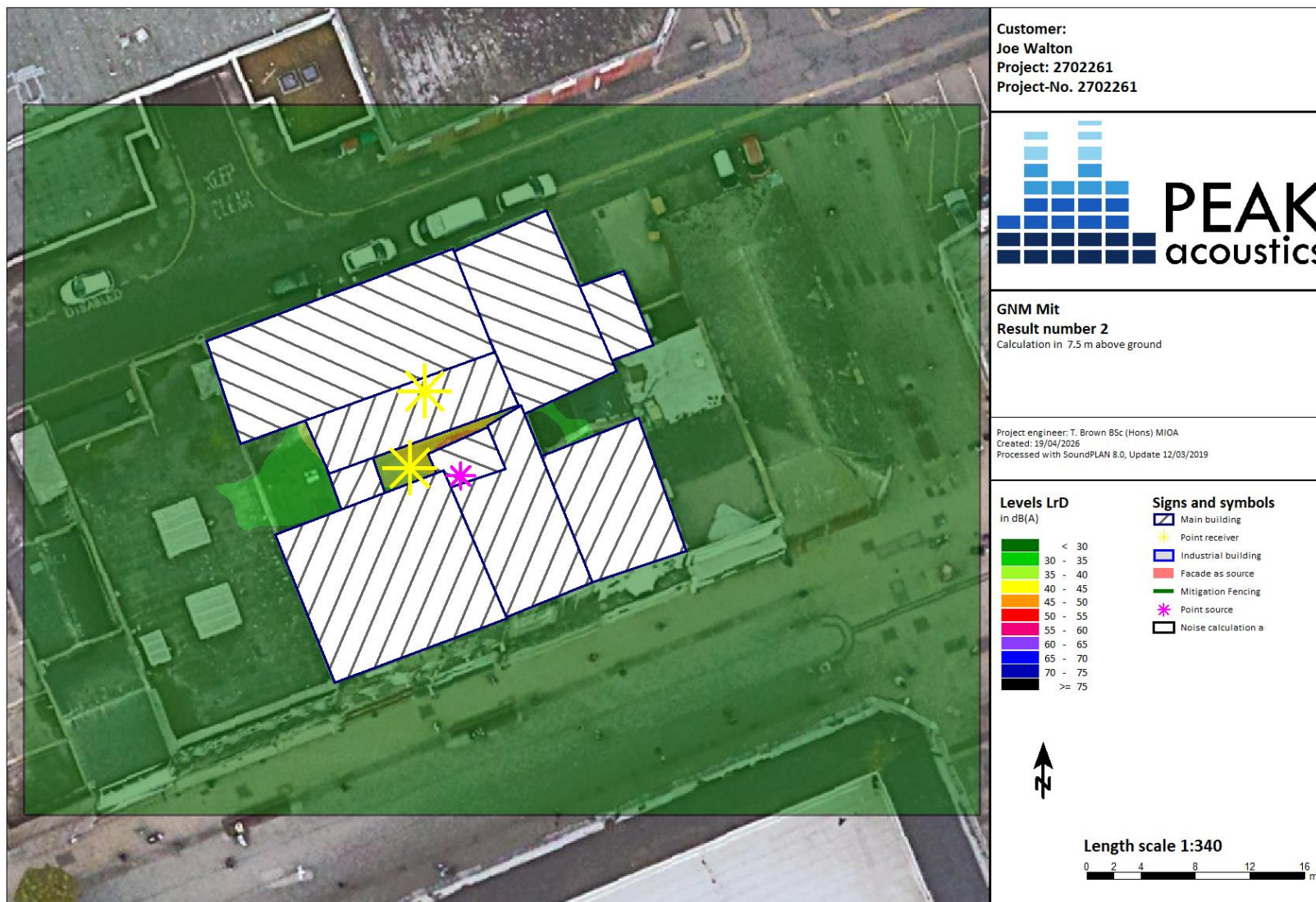


Figure 6: 2D Grid Noise Map of daytime Mitigated Impact Assessment

APPENDIX G - Manufacturer Technical Data Sheets

	Sound Spectrum (Hz)								Overall	
	63	125	250	500	1k	2k	4k	8k	Lw*	LpA @ 3 m**
Inlet*	91	89	96	98	95	94	90	87	103	81
Outlet*	93	89	98	99	95	94	90	87	104	81
Breakout*	83	71	76	76	70	66	68	63	85	57

* Lw dB re 10^{-12} W
Sound data at requested duty.

** dBA re 2×10^{-5} Pa

Figure 7: Data sourced from Woods 45 Maxfan Compac Specification Sheet.

APPENDIX H - Site Plans

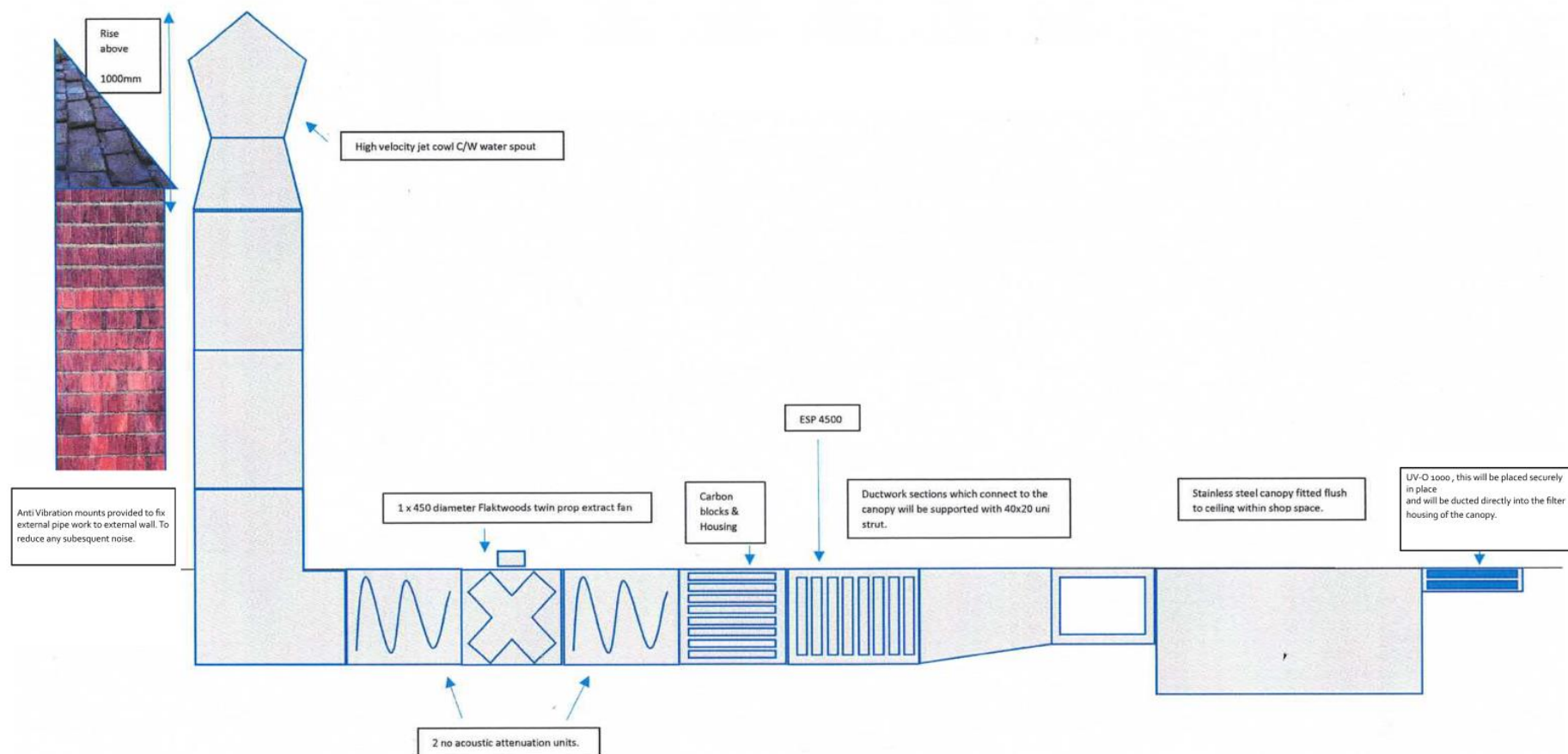


Figure 8: Site Plans Provided by applicant

APPENDIX I - Legislation, Policy & Guidance

Guidance for the assessment of noise affecting new residential development is given in the National Planning Policy Framework (NPPF). Section 15 of the NPPF states:

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

e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of...noise pollution.”

Section 185 further states:

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

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

Section 187 states:

“Planning policies and decisions should ensure that new development can be integrated effectively with existing businesses and community facilities (such as places of worship, pubs, music venues and sports clubs). Existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established. Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or ‘agent of change’) should be required to provide suitable mitigation before the development has been completed.”

To avoid and mitigate adverse noise effects on health arising from and impacting 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.

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.

The NPSE does not define the SOAEL numerically, stating in paragraph 2.22:

"It is not possible to have a single objective noise-based measure that defines SOAEL that is applicable to all sources of noise in all situations. Consequently, the SOAEL is likely to be different for different noise sources, for different receptors and at different times. It is acknowledged that further research is required to increase our understanding of what may constitute a significant adverse impact on health and quality of life from noise. However, not having specific SOAEL values in the "NPSE provides the necessary policy flexibility until further evidence and suitable guidance is available."

There is no local or national guidance on how the three terms should be defined numerically, it is for the assessor to collate and interpret appropriate guidance on noise, such as may be found in British Standards, and correlate the guidance with the concepts of NOEL, LOAEL and SOAEL.

BS4142:2014+A1:2019

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 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 between 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."

Achievement of a *Low Impact* in accordance with BS4142 along with a contextual assessment can be deemed to correspond to '*NOEL – No Observed Effect Level*' in the NPSE.

BS8233:2014

BS8233:2014 - *Guidance on sound insulation and noise reduction for buildings* suggests indoor ambient noise levels for dwellings in Table 4, Section 7.7.2. These are summarised below.

Activity	Location	07:00 to 23:00	23:00 to 07:00
Resting	Living Room	35 dB $L_{Aeq,16hour}$	-
Dining	Dining room/area	40 dB $L_{Aeq,16hour}$	-
Sleeping	Bedroom	35 dB $L_{Aeq,16hour}$	30 dB $L_{Aeq,8hour}$

BS8233 states that the guideline values given above are for ‘noise without character’, further stating:

“Noise has a specific character if it contains features such as a distinguishable, discrete and continuous tone, is irregular enough to attract attention, or has strong low-frequency content, in which case lower noise limits might be appropriate.”

Table 4 of BS8233 also has accompanying notes that were subject to additions in ProPG. The relevant notes with the additions of ProPG are given below.

“NOTE 4 Regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance. A guideline value may be set in terms of SEL or $L_{Amax,F}$, depending on the character and number of events per night. Sporadic noise events could require separate values. In most circumstances in noise sensitive rooms at night (e.g. bedrooms) good acoustic design can be used so that individual noise events do not normally exceed 45dB $L_{Amax,F}$ more than 10 times a night. However, where it is not reasonably practicable to achieve this guideline then the judgement of acceptability will depend not only on the maximum noise levels but also on factors such as the source, number, distribution, predictability and regularity of noise events.”

“NOTE 7 Where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal L_{Aeq} target levels may be relaxed by up to 5 dB and reasonable internal conditions still achieved.”

APPENDIX J - 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 of 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 over 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 fluctuating 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.