Acoustic Assessment at



KFC Hulme

Manchester

Document Ref: 892526

Date: 15/07/2026

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Executive Summary

Ned Johnson Acoustic Consultants Limited has been appointed to undertake an acoustic assessment of the proposed extension of hours for the use of the drive-thru at KFC Hulme, Manchester.

The assessment takes account of the existing noise environment, which has been quantified using direct measurement to take account of the proposed extension of the opening hours for the drive-thru.

The effect of vehicle movements into the car park and the drive thru are not predicted to have a negative effect upon the residential amenity at the nearest residential property.

The sound from the mechanical plant is lower than the background noise levels during the proposed extended hours at the façade of the nearest residential property.

The predictions in this report are based upon the information provided by the client regarding the likely number of vehicle movements per hour for the extended hours.

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1. Introduction

1.1 Ned Johnson Acoustic Consultants Limited has been appointed to undertake an acoustic assessment of the proposed extension of trading hours for the drive-thru at KFC Hulme.

1.2 The current opening hours for the restaurant and drive-thru are Monday – Sunday 10:00 – 00:00. The proposed opening hours for the drive thru Monday – Sunday 10:00 – 05:00.

1.3 The noise levels from the site at the nearest noise-affected property has been calculated and compared to the requirements of Manchester City Council as set out in their Planning & Noise Guidance as well as using the methodology set-out in BS4142:2014. The requirement is that noise from the site shall be at least 5dB below the background noise level.

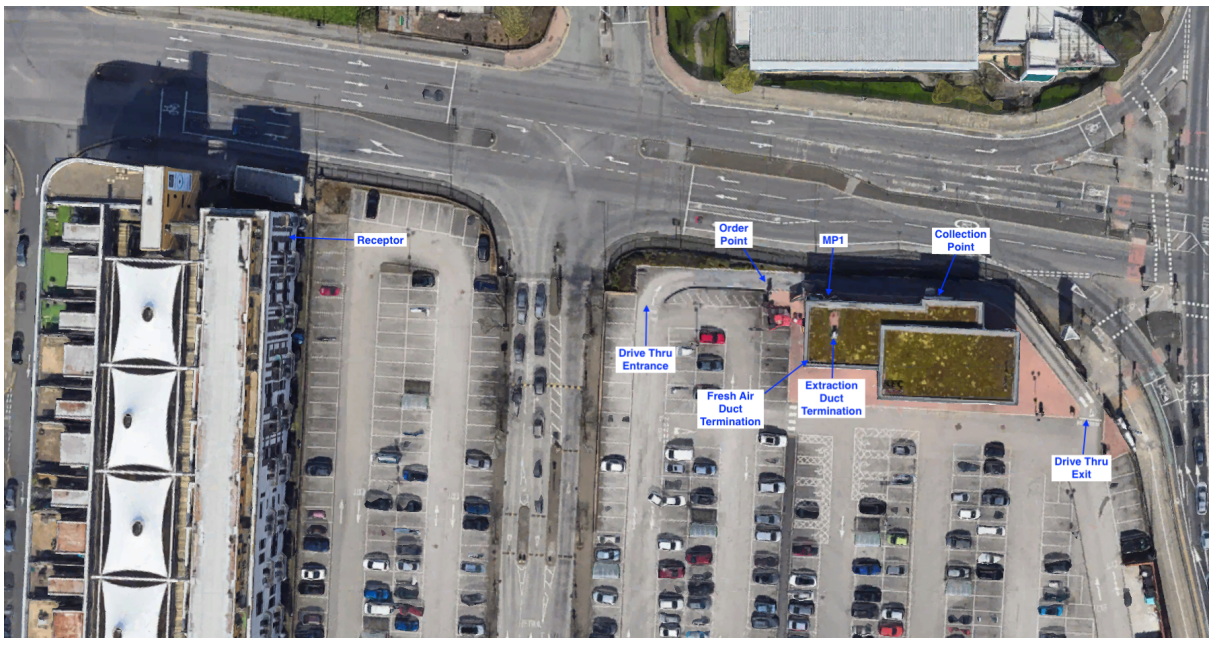
1.4 The predictions for traffic movements are based upon the information provided by the client for the site. Car park noise and drive thru noise and mechanical plant noise predictions are based on data collected at this location.

2. Site Description

2.1 The site is currently an operating KFC located at Hulme Retail Park.

2.2 Figure 1 below shows the location of the development. MP1 was the measurement point and is representative of the receptor because although it was on a flat roof at KFC, it is the same distance from Greenheys Lane West as the nearest receptor. When comparing the background sound level measured at MP1 to the background sound level in the original acoustic report at night (same receptor location) there is a difference of 1dB. This demonstrates that MP1 was appropriate for background measurements.

Figure 1.



2.3 The nearest residential property is located is 87 metres from the KFC building. At the receptor the dominant sound was road traffic on the local road network.

2.4 The extraction system is on the roof and is 93 metres from the receptor.

2.5 MP1 was positioned to be representative of the sound environment at the receptor. Measurements for background sound were after KFC had closed. It was not possible to put the sound level meter next to the receptor as there was nowhere secure to leave it. This positioning follows the guidance in BS4142:2014+A1 2019 as it is at a different location but is representative of the sound levels at the receptor.

2.6 At the site, cars enter KFC from the car park, where the drive thru entrance is located and drive slowly to the ordering point, which is 82 metres from the receptor. The cars then drive round to the collection point, which is 111 metres from the receptor.

2.7 KFC Have confirmed that they expect 10 vehicles per hour maximum to use the site during the later hours. This is based on data from other KFC sites.

2.8 The context of the site is that it is a busy location where there are regular vehicle movements on the local road network day and at night. The measurement point was representative of the background and ambient sound levels at the receptor.

2.9 In terms of the sensitivity, the receptors in this location are not more sensitive due to the period of time when the site operates due to the traffic noise on the local road network.

2.10 The noise from the site operations will have a BS4142 rating of at least 5dB below background sound levels. It is considered that a rating level below background is a low impact.

3. Reference Documents

National Planning Policy Framework

3.1 The Department of Housing, Communities and Local Government published the National Planning Policy Framework (NPPF) in December 2024.

3.2 Paragraphs 187 (e) 198(a), (b) and 200 refer to noise in terms of policy approach:

187. 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 soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans; and

198. 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 impacts 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

200. 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.

Noise Policy Statement for England

3.3 The Department for Environment, Food and Rural Affairs published the *Noise Policy Statement for England* (NPSE) in March 2010. The explanatory note of NPSE defines the terms used in the NPPF:

"2.20 There are two established concepts from toxicology that are currently being applied to noise impacts, for example, by the World Health Organisation. They are:

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.

2.21 Extending these concepts for the purpose of this NPSE leads to the concept of a significant observed adverse effect level.

SOAEL – Significant Observed Adverse Effect Level. This is the level above which significant adverse effects on health and quality of life occur."

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

"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."

3.5 There is no local or national guidance on how the three terms should be defined numerically.

3.6 There are three aims in the NPSE, which match, and expand upon, the first two bullet points in paragraph 123 of the NPPF and add a third aim that relates to a wider improvement in health and quality of life (the bold text is in the NPSE):

3.7 The first aim of the NPSE states that significant adverse effects on health and quality of life should be avoided while also taking into account the guiding principles of sustainable development.

3.8 The second aim of the NPSE refers to the situation where the impact lies somewhere between LOAEL and SOAEL. It requires that all reasonable

steps should be taken to mitigate and minimise adverse effects on health and quality of life while also taking into account the guiding principles of sustainable development. This does not mean that such adverse effects cannot occur.

3.9 This aim seeks, where possible, positively to improve health and quality of life through the pro-active management of noise while also taking into account the guiding principles of sustainable development, recognising that there will be opportunities for such measures to be taken and that they will deliver potential benefits to society. The protection of quiet places and quiet times as well as the enhancement of the acoustic environment will assist with delivering this aim.

British Standard 8233

3.10 The scope of British Standard 8233: 2014 *Sound insulation and noise reduction for buildings – Code of practice* is the provision of recommendations for the control of noise in and around buildings. It suggests appropriate criteria and limits for different situations, which are primarily intended to guide the design of new or refurbished buildings undergoing a change of use.

3.11 The standard suggests suitable internal noise levels for residential dwellings, as shown in Table 1. Below.

Table 1.

Activity	Location	07:00 - 23:00 $L_{Aeq, 16\ hour}$	23:00 - 07:00 $L_{Aeq, 8\ hour}$
Resting	Living Rooms	35	-
Dining	Dining Area	40	-
Sleeping	Bedrooms	35	30

3.12 BS8233:2014 also proposes noise levels for outside amenity areas, such as gardens and patios, should not exceed 50dB $L_{Aeq, T}$, with an upper limit of 55dB $L_{Aeq,T}$ in noisier environments.

3.13 In terms of this development the internal noise levels have been compared to the internal noise levels in Table 1. It is suggested in this report that by meeting these noise levels the development would be classed as NOAEL.

British Standard 4142:2014

3.14 The scope of British Standard 4142: *Method for rating industrial noise affecting mixed residential and industrial areas* describes methods for determining, at the outside of a building:

a) noise levels from factories, or industrial premises, or fixed installations, or sources of an industrial nature in commercial premises; and

b) background noise level.

3.15 In particular BS4142 describes the*"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." It sets out a methodology for assessing a noise Rating level which is a combination of absolute or 'specific' noise level (in terms of L_{Aeq} average noise level over different durations; 1 hour for daytime and 15 minute at night); and then including penalties to account for character of a noise (i.e. tonality, impulsivity, intermittency and 'other').

3.16 BS4142 applies to new noise sensitive developments that are proposed near existing industrial sources, the following paragraph relates to such developments:

"Where a new noise-sensitive receptor is introduced and there is extant industrial and/or commercial sound, it ought to be recognized that the industrial and/or commercial sound forms a component of the acoustic environment. In such circumstances other guidance and criteria in addition to or alternative to this standard can also inform the appropriateness of both introducing a new noise-sensitive receptor and the extent of required noise mitigation."

Further to this BS4142:2014 also notes that other standards may be relevant; in this development this would include BS8233:2014.

3.17 The rating levels in BS4142 are as follows:

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

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

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

d) The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an

adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context."

3.18 BS4142:2014 also states *'where the initial estimate of the impact needs to be modified due to the context, take all pertinent factors into consideration'.* In terms of those factors the document states the following: *'The sensitivity of the receptor and whether dwellings or other premises used for residential purposes will already incorporate design measures that secure good internal and/or outdoor acoustic conditions, such as, facade insulation ii) ventilation and/or cooling that will reduce the need to have windows open so as to provide rapid or purge ventilation; and acoustic screening.'*

3.19 Where there is an adverse impact in terms of the BS4142 rating mitigation can be proposed to reduce the impact or achieve desirable internal noise levels.

3.20 In terms of impact of increases in sound the following table sets out the effect of increase in sound levels, which is based upon consensus of opinion by acousticians.

Table 2.

Increase in Noise Level (dB)	Response	Impact
Less than 3dB	Imperceptible	None
3 - 5	Perceptible	Slight/Moderate
6 - 10	Clearly Audible	Adverse
+10	To the ear the change is more than double	Significantly Adverse

4. Survey Methodology

4.1 The survey was conducted over a 5-hour period on June 19th to June 20th 2026, 00:00 – 05:00. These times cover the quietest time when the KFC would operate.

4.2 The instrument used for the survey was a Svantek 971A precision grade sound level meter.

4.3 The sound level meter was calibrated immediately before and after the survey with a Bruel & Kjaer 4231 Acoustic Calibrator producing 94dB$_A$ at 1KHz and no drift was noted in calibration readings. Both calibration results were 93.8dB$_A$.

4.4 During the survey there were no unusual noise events. The sound level meter was set to log every 15 minutes. The metrics measured were L_{Aeq} and L_{A90}.

4.5 The measurements at MP1 were with the sound level meter microphone mounted on a tripod in a weatherproof enclosure.

4.6 Measurements were taken at KFC, 1 metre from the ordering point and from a car at 1 metre, driving to the collection point and customer vehicles parking. It was not possible to measure the mechanical plant as it was on the highest part of the roof and not accessible. Plant noise is calculated using the fan manufacturer's data.

4.7 During the survey the temperature was 20°C – 13°C with a wind speed of 0.5 metres per second, a short period of precipitation and 70% cloud cover. Weather conditions did not interfere with the measurements and no adjustment is required. Measurements were made with an anemometer.

5. Acoustic Survey Results

5.1 The results of the survey show that the typical measured background for the period 00:00 – 05:00 was 48dB L_{A90} The typical ambient noise level during the same period was 55dB L_{Aeq}. In the original site acoustic report the typical night time L_{A90} was 47dB, demonstrating that the measured L_{A90} for this report is representative of the receptor location.

5.2 No penalties in the BS4142 assessment have been added as the extraction system runs continuously during restaurant opening hours. Using the subjective method in BS4142, the data for the fans, do not show tonality and no penalty has been added.

5.3 The impact of the extraction and fresh air systems has been calculated. Due to the attenuation with distance to the receptor no noise control is necessary. The combined sound pressure level of the extraction and fresh air systems is 40dB$_A$.

5.4 The following table presents the BS4142 assessment for the mechanical plant.

Table 3. BS4142 assessment for impact of the mechanical plant 00:00 – 05:00

Results	Measurement	Clause	Commentary
Typical ambient sound level	L_{Aeq} = 55dB	7.3.1	
Typical background sound level	L_{A90} = 48dB	8.3	
Specific sound level of the plant at nearest residential window	40dB$_A$		
Acoustic feature	0dB	9.2	No intermittency penalty and no tonality or impulsivity
Rating level	40dB$_A$	11	Sound source
Typical background sound level	L_{A90} = 48dB	8.3	
Rating level at receptor point	-8dB	11	
The assessment shows that there is likely to be no adverse impact at receptor point			
Uncertainty of the assessment			The rating level is -8 dB and in this instance the uncertainty of the measurement does not have any significance to the outcome of the assessment.

5.5 The movement of cars out of the drive-thru has been predicted based upon data gathered from a car pulling out of the drive thru after collection.

Table 4. Cars leaving the collection point measured as L_{AE}

Procedure	Sound Levels
Car pulling away at 1m	72dB$_A$
Attenuation to 111m to receptor	-41dB
Correction of 1-hour	-36dB
Correction for 10 vehicles leaving	+10dB
Result at the receptor	**5dB$_A$**

5.6 Noise from the ordering point at the drive-thru was measured and the impact has been calculated at the nearest noise sensitive property

Table 5. Ordering point noise impact

Procedure	Sound Levels
Ordering point noise level at 1 metre (10 seconds)	70dB$_A$
Attenuation to 82m	-38dB
Correction to 1-hour	-26dB
Correction for 10 vehicles	+10
Result at the receptor	**16dB$_A$**

5.7 The noise from the cars driving round the drive-thru to the collection point has been calculated and the results can be found in the table below from the nearest point to the receptor.

Table 6. Cars driving to collection point site measured as L_{AE}

Procedure	Sound Levels
Car pass noise level at 1 metre	69dB$_A$
Attenuation to 82m	-38dB
Correction for 10 cars	+10dB
Correction to 1-hour	-36dB
Result at the receptor	**5dB$_A$**

5.8 The calculations of the impact of cars entering the drive thru on the receptor can be seen in the table below.

Table 7. Cars entering the drive thru measured as L_{AE}

Procedure	Sound Levels
Car entering the drive thru measured at 1m	69dB$_A$
Attenuation to 66m	-39dB
Correction for 10 cars	+10dB
Correction to 1-hour	-36dB
Result at the receptor	**4dB$_A$**

5.9 The calculations of the impact of cars parking on the site at the receptor can be seen in the table below.

Table 8. Cars parking at the site measured as L_{Aeq}

Procedure	Sound Levels
Car reversing into a space measured at 1m (5 seconds)	65dB$_A$
Attenuation to 60m	-36dB
Correction for 10 cars	+10dB
Correction to 1-hour	-29dB
Result at the receptor	**10dB$_A$**

5.10 The following table combines the various activities at site.

Table 9.

Procedure	Sound Levels dB$_A$
Mechanical plant	40
Car entering drive thru	4
Cars parking	10
Ordering point	16
Cars driving to collection point	5
Cars leaving collection point	5
Result at the receptor	**40**

6 Evaluation of results

6.1 The impact of the activities at KFC Hulme on the nearest residential properties has been determined by comparing the measured sound levels with the criteria set out in Section 3 of this report.

6.2 The BS4142 assessment shows that the noise from the mechanical plant is 8dB below the typical background noise level during the period 00:00 – 05:00.

6.3 The predictions for the use of the drive thru show that the noise from the cars entering the drive thru at the receptor will be $4dB_A$ over the course of an hour. This is 44dB lower than the typical background sound level and 51dB lower than the existing ambient noise environment.

6.4 The predictions for the sound from driving to the collection point at the receptor will be $5dB_A$. This is 43dB lower than the typical background sound level and 50dB lower than the typical ambient sound level.

6.5 The predictions for the use of the drive thru show that the noise from the ordering point at the receptor will be $16dB_A$. This is 32dB lower than the typical background sound level and 39dB lower than the typical ambient sound level.

6.6 The predictions of noise from cars pulling away from the drive thru collection point at the façade of the receptor is $5dB_A$. This sound pressure level is 43dB below the typical background sound level and 50dB lower than the measured existing typical ambient noise environment.

6.7 The predictions of noise from cars parking at the site at the façade of the receptor is $10dB_A$. This sound pressure level is 38dB below the typical background sound level and 45dB lower than the measured existing

typical ambient noise environment and therefore will have no effect on the residents.

6.8 The combined noise level of all the activities associated with vehicles and plant at the receptor is predicted to be 40dB$_A$. This is 8dB below the typical background sound level and 15dB below the typical ambient sound level and will have not cause a loss of amenity.

Appendix 1: Glossary of Terms

Daytime Defined in BS8233 and BS4142 as the period 07:00-23:00 hours.

Night-time Defined in BS8233 and BS4142 as the period 23:00-07:00 hours.

Decibel (dB): A unit of level derived from the logarithm of the ratio between the value of a quantity and a reference value. It is used to describe the level of many different quantities. For sound pressure levels the reference quantity is 20 uPa. The threshold of normal hearing is in the region of 0 dB and 140 dB is the threshold of pain. A change of 1 dB is only perceptible under controlled conditions.

dB_A: Decibels measured on a sound level meter incorporating a frequency weighting (A weighting) which differentiates between sounds of different frequency (pitch) in a similar way to the human ear. Measurements in dB_A broadly agree with people's assessment of loudness. A change of 3 dB is the minimum perceptible under normal conditions, and a change of 10 dB corresponds roughly to halving or doubling the loudness of a sound. The background noise in a living room may be about 30 dB_A; normal conversation about 60 dB_A at 1 metre; heavy road traffic about 80 dB_A at 10 metres; the level near a pneumatic drill about 100 dB_A.

$L_{A10,T}$: The A weighted noise level exceeded for 10% of the measurement period, T. It gives an indication of the upper limit of fluctuating noise such as that from road traffic.

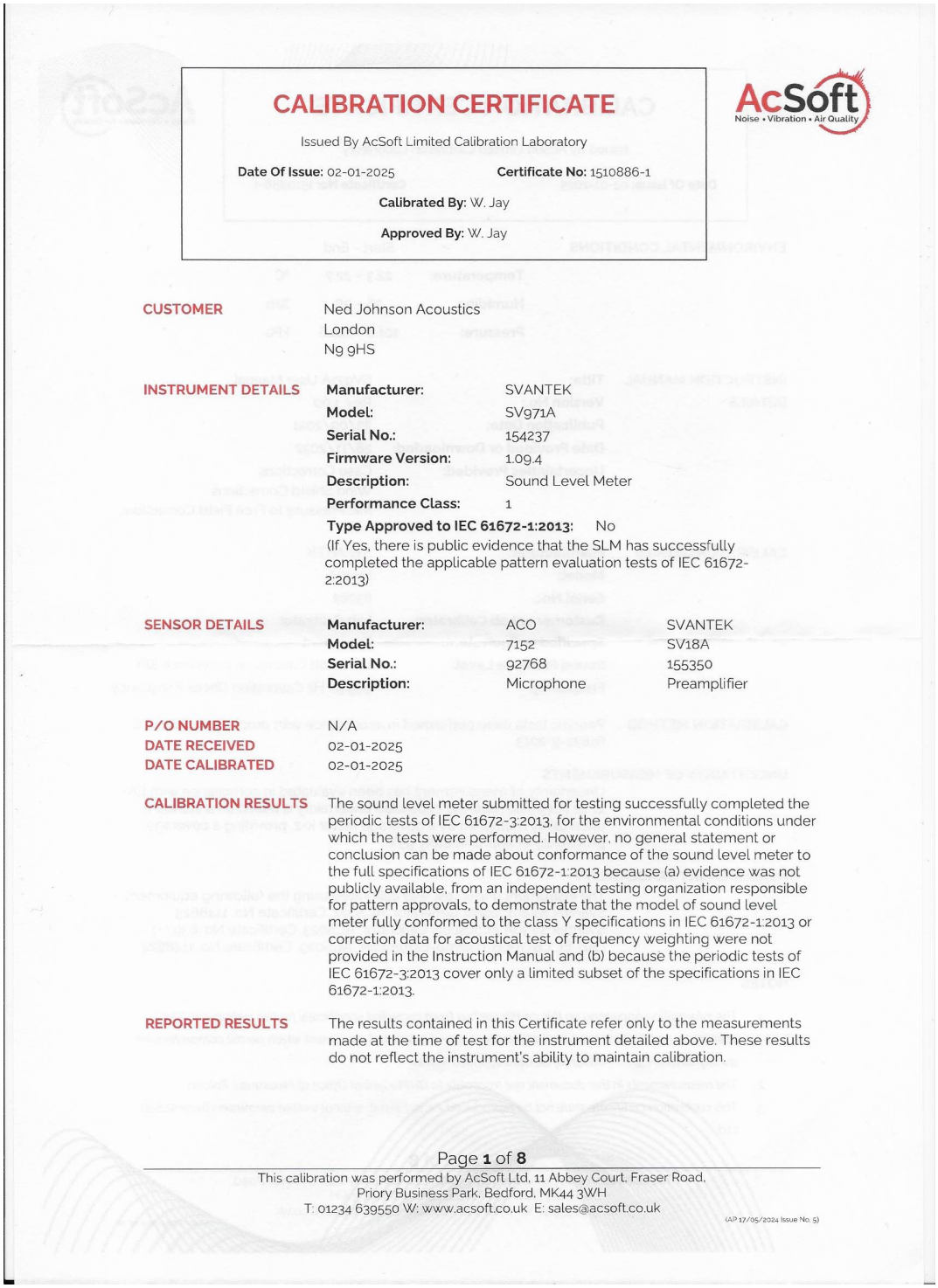
$L_{A90,T}$: The A weighted noise level exceeded for 90% of the measurement period, T. This is defined in BS 4142 as the background noise level.

L_{AE}: The sound exposure level – the level of a sound with a period of 1 second that has the same sound energy as the event considered.

$L_{Aeq,T}$: The equivalent continuous sound level – the sound level of a notionally steady sound having the same energy as a fluctuating sound over a specified measurement period (T).

$L_{A\ Max}$: The highest A weighted noise level recorded during a noise event. The time weighting (slow or fast) should be stated.

Appendix 2: Calibration Certificates



CALIBRATION CERTIFICATE

Issued By AcSoft Limited Calibration Laboratory

Date Of Issue: 02-01-2025 **Certificate No:** 1510886-1

Calibrated By: W. Jay

Approved By: W. Jay

CUSTOMER

Ned Johnson Acoustics
London
Ng 9HS

INSTRUMENT DETAILS

Manufacturer:	SVANTEK
Model:	SV971A
Serial No.:	154237
Firmware Version:	1.09.4
Description:	Sound Level Meter
Performance Class:	1

Type Approved to IEC 61672-1:2013: No
(If Yes, there is public evidence that the SLM has successfully completed the applicable pattern evaluation tests of IEC 61672-2:2013)

SENSOR DETAILS

Manufacturer:	ACO	SVANTEK
Model:	7152	SV18A
Serial No.:	92768	155350
Description:	Microphone	Preamplifier

P/O NUMBER N/A
DATE RECEIVED 02-01-2025
DATE CALIBRATED 02-01-2025

CALIBRATION RESULTS

The sound level meter submitted for testing successfully completed the periodic tests of IEC 61672-3:2013, for the environmental conditions under which the tests were performed. However, no general statement or conclusion can be made about conformance of the sound level meter to the full specifications of IEC 61672-1:2013 because (a) evidence was not publicly available, from an independent testing organization responsible for pattern approvals, to demonstrate that the model of sound level meter fully conformed to the class Y specifications in IEC 61672-1:2013 or correction data for acoustical test of frequency weighting were not provided in the Instruction Manual and (b) because the periodic tests of IEC 61672-3:2013 cover only a limited subset of the specifications in IEC 61672-1:2013.

REPORTED RESULTS

The results contained in this Certificate refer only to the measurements made at the time of test for the instrument detailed above. These results do not reflect the instrument's ability to maintain calibration.

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This calibration was performed by AcSoft Ltd, 11 Abbey Court, Fraser Road, Priory Business Park, Bedford, MK44 3WH
T: 01234 639550 W: www.acsoft.co.uk E: sales@acsoft.co.uk

(AP 17/05/2024 Issue No. 5)

CALIBRATION CERTIFICATE

Issued By AcSoft Limited Calibration Laboratory

Date Of Issue: 02-01-2025 **Certificate No:** 1510886-1

ENVIRONMENTAL CONDITIONS

	Start - End	
Temperature:	22.3 – 22.7	°C
Humidity:	36 – 38	%rh
Pressure:	101.6 – 101.6	kPa

INSTRUCTION MANUAL DETAILS

Title:	SV971A User Manual
Version No.:	Rev. 1.00
Publication Date:	23/09/2021
Date Provided or Downloaded:	28/11/2022
Uncertainties Provided:	Case Corrections Wind Shield Corrections Mic Pressure to Free Field Corrections

CALIBRATOR DETAILS

Manufacturer:	SVANTEK
Model:	SV30A
Serial No.:	83782
Customer or Lab Calibrator:	Lab Calibrator
Specified or Equivalent:	Equivalent
Sound Pressure Level:	114.00 dB Calibration Reference SPL
Frequency:	999.97 Hz Calibration Check Frequency

CALIBRATION METHOD

Periodic tests were performed in accordance with procedures from IEC 61672-3: 2013.

UNCERTAINTY OF MEASUREMENTS

Uncertainty of measurement has been evaluated in compliance with EA-4/02:2013. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a coverage probability of approximately 95%.

MEASUREMENT TRACEABILITY

The instrument under test was calibrated using the following equipment:
Svantek SV401 Signal Generator, ACS022, Certificate No. 1148625
Svantek SV30A Acoustical Calibrator, ACS023, Certificate No. 6397/1
LAB-EL LB-706B Thermo-Barometer, ACS029, Certificate No. 1148624

NOTES

1. *The information appearing on this certificate has been compiled specifically for this instrument. This calibration certificate is produced with traceable and advanced equipment which permit comprehensive quality assurance verification of all data supplied herein.*
2. *The measurements in this document are traceable to GUM (Central Office of Measures), Poland*
3. *This calibration certificate shall not be reproduced except in full, without written permission from AcSoft Ltd.*

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This calibration was performed by AcSoft Ltd, 11 Abbey Court, Fraser Road, Priory Business Park, Bedford, MK44 3WH
T: 01234 639550 W: www.acsoft.co.uk E: sales@acsoft.co.uk

(AP 17/05/2024 Issue No. 5)

Laboratory Location

Campbell Associates Ltd
5b Chelmsford Road Industrial Estate
GREAT DUNMOW, Essex, GB-CM6 1HD
Phone 01371 871030

CALIBRATION

Certificate of Calibration

Certificate number: **55015**

Test Object: **Sound Calibrator**

Producer: **Brüel & Kjær**
Type: **4231**
Serial number: **2039392**
Customer: **Ned Johnson Acoustic Consultants Ltd**
Address: **378 Church Street,**
London. N9 9HS.
Contact Person: **Ned Johnson.**
Order No:

Measurement Results	Level dB	Level Stability dB	Frequency Hz	Distortion %
Measurement 1	94.04	0.02	999.85	0.53
Measurement 2	94.03	0.02	999.86	0.54
Measurement 3	94.04	0.02	999.86	0.52
Result (Average):	**94.04**	**0.02**	**999.85**	**0.53**
Expanded Uncertainty:	0.1	0.02	1	0.1
Degree of Freedom:	>100	>100	>100	>100
Coverage Factor:	2	2	2	2

The stated level is relative to 20µPa. The level is traceable to National Standards. The stated level is valid at reference conditions. The following correction factors have been applied during the measurement
Pres:0.0008 dB/kPa Temp:0.0015 dB/°C Humi:0.001 dB/%rh Load volume: 0.0003 dB/mm3

Conditions	*Pressure kPa*	*Temperature °C*	*Humidity %RH*
Reference conditions	101.325	23	50
Measurement conditions	99.293 ±0.042	23.1 ±0.1	55.2 ±1.1

The reported expanded uncertainty of measurements is based on a standard uncertainty multiplied by the coverage factor of k=2, providing a level of confidence of approximately 95%. Where the degrees of freedom are insufficient to maintain this confidence level, the coverage factor is increased to maintain this confidence level. The uncertainty has been determined in accordance with UKAS requirements.

Records: K:\C A\Calibration\Nor-1504\Nor-1018 CalCal\Current Year\BNK4231_2039392_M1.nmf

Preconditioning
The equipment was preconditioned for more than 4 hours in the specified calibration environment.

Method
Calibration has been performed as set out in the current version of CA Technical procedure TP01

Calibration Dates:

Received date:	20-May-2026	Reviewed date:	04-Jun-2026
Calibration date:	03-Jun-2026	Issued date:	04-Jun-2026

Technicians: (Electronic certificate)
Calibrated by: *Palanivel Marappan BEng(Hons), MSc*
Reviewed by: *Robyn Pezaro*

This certificate is issued in accordance with the laboratory accreditation requirements of the United Kingdom Accreditation Service. It provides traceability of measurement to the SI system of units and/or to units of measurement realised at the National Physical Laboratory or other recognised national metrology institutes. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.

Doc ref: Calb-V6-Cert-Master-V4-02

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Appendix 3: Uncertainty

The measurement method used was to measure the existing background noise levels.

As part of the BS4142 assessment the headings from the 2014 standard have been used to consider where uncertainty in the measurements may have occurred.

The complexity of the sound source and the level of variability in sound emission from the source

The noise from the extraction plant did not vary and it ran continuously before closing.

The complexity and level of variability of the residual acoustic environment

The residual sound level is dominated by road traffic on the local road network.

The ambient environment overall provided consistent, reproducible results and therefore uncertainty for this aspect is low.

The level of residual sound in the presence of the specific sound at the measurement location

The residual sound level is dominated by road traffic on the local road network.

The location(s) selected for taking the measurements

The location for measurements followed the guidance in BS4142:2014 and was representative of the noise sources in the area.

The distance between sources of sound and the measurement location and intervening ground conditions

The nearest distance between the site and the receptor is 87 metres. The ground is flat between source and measurement location.

The number of measurements taken

5-hours of data was collected in 15-minute periods during the period proposed for extended opening hours of the drive-thru, providing a data set which is representative of the quietest conditions during operational hours. Overall there is a reliable dataset from which to derive the typical background noise levels and uncertainty is low.

The measurement time intervals

The time intervals for logged data were 15-minute periods, which is an appropriate period for this type of survey and uncertainty is low.

The range of times when the measurements have been taken

The measurement times were representative of the background and ambient sound levels.

The range of suitable weather conditions during which measurements have been taken

During the surveys the wind conditions were suitable as they did not exceed 5m/s at any time; there was also a short period of precipitation and temperature was 20^{o}C - 13^{o}C. All conditions were recorded, including cloud cover and all were in line with the requirements of BS4142 and therefore uncertainty due to weather is low.

The measurement method and variability between different practitioners in the way the method is applied

The method for taking measurements followed that required in BS4142. The measurement procedure is reproducible and therefore uncertainty is low.

The level of rounding of each measurement recorded

Where necessary results have been rounded to the nearest whole decibel; any results at 0.5 have been rounded up.

The instrumentation used

The instrument used is a class 1 sound level meter and calibrator and have all been calibrated to a traceable standard at a UKAS accredited laboratory in the last 24 months (12 months for the calibrator). Uncertainty due to instrumentation is low.

Uncertainty in any measured sound levels used in calculations

The activities on site were all measured and the data was used for all calculations and uncertainty is low.

Uncertainty in the operation or sound emission characteristics of the specific sound source and any assumed sound power levels

Measured data was used and uncertainty is low.

Uncertainty in the calculation method

Standard calculation for attenuation with distance was used in the calculations and all calculations followed normal acoustic methods. For this reason, uncertainty is low.

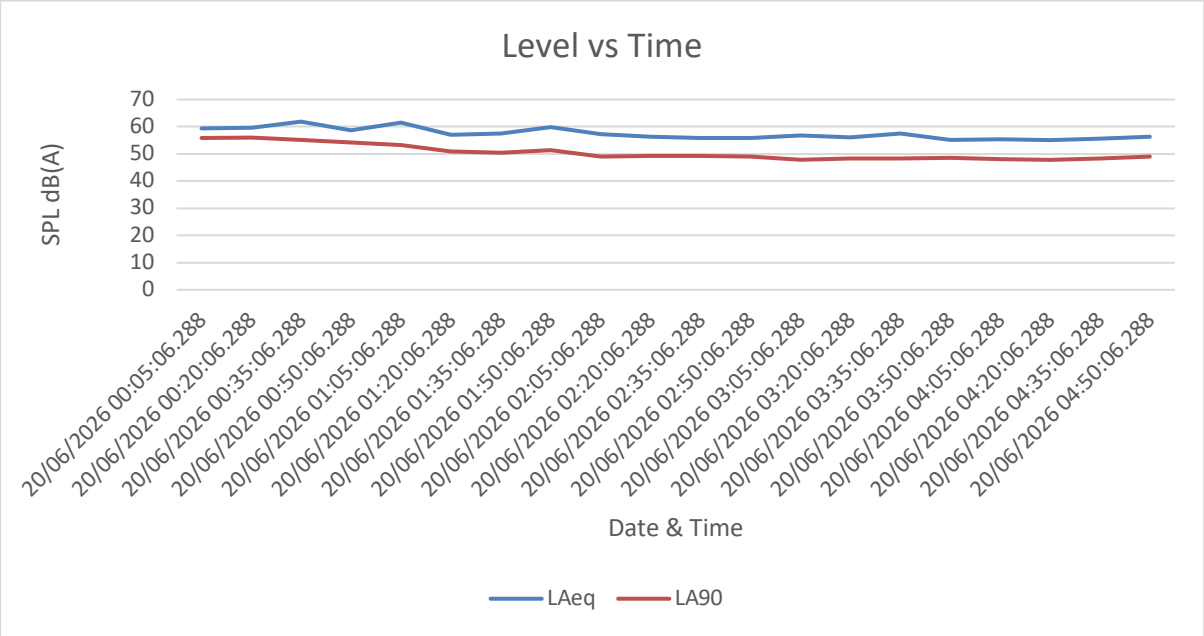
Simplifying the real situation to 'fit' the model (user influence on modelling)

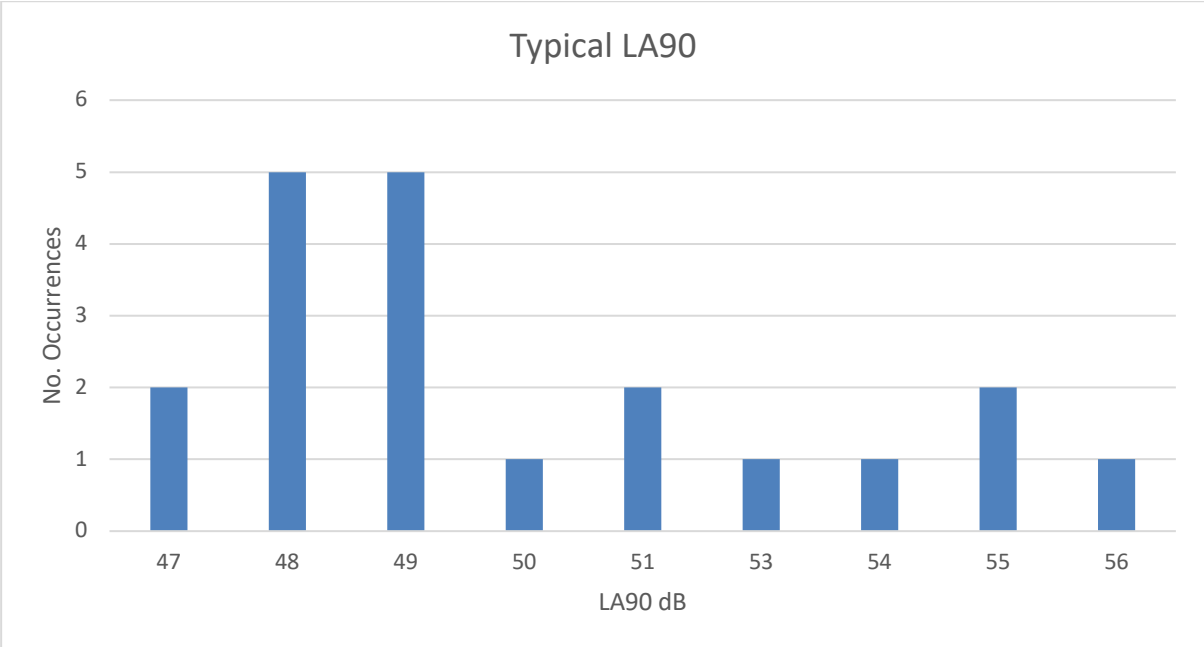
The performance of the plant and emissions was not modelled. All calculations were based on the site characteristics.

Error in the calculation process

All calculations were checked by a colleague in an independent consultancy and uncertainty is low.

Appendix 4: Data





Appendix 5: Calculations

Table 10. Impact to the residential property nearest due to extraction system.

Procedure	Overall								
	63	125	250	500	1000	2000	4000	8000	
Sound power level of fan (dB)	86	85	93	92	90	87	83	79	
A-weighting	-26.2	-16.1	-8.6	-3.2	0	1.2	1	-1.1	
Conversion to sound pressure	-8	-8	-8	-8	-8	-8	-8	-8	
Attenuation to 93m	-39	-39	-39	-39	-39	-39	-39	-39	
End reflection	-5	-2	0	0	0	0	0	0	
Bend reflection	0	0	-1	-2	-3	-3	-3	-3	
Directivity reduction	0	0	-3	-5	-8	-10	-12	-15	
Total (dB_A)	7.8	19.9	33.4	34.8	32	28.2	22	12.9	39

Table 11. Impact at the residential property due to fresh air system.

Procedure	Overall								
	63	125	250	500	1000	2000	4000	8000	
Sound power level of fan (dB)	71	72	81	78	74	70	64	58	
A-weighting	-26.2	-16.1	-8.6	-3.2	0	1.2	1	-1.1	
Conversion to sound pressure	-8	-8	-8	-8	-8	-8	-8	-8	
Attenuation to 93m	-39	-39	-39	-39	-39	-39	-39	-39	
Bend reflection	0	0	-1	-2	-3	-3	-3	-3	
Total (dB_A)	-2.2	8.9	24.4	25.8	24	21.2	15	6.9	30

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