

Acoustic Assessment at



Whitehorse Service Station

Clothall Road, Baldock

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Executive Summary

Ned Johnson Acoustic Consultants Limited has been appointed to undertake an acoustic assessment of the proposed petrol station activities at Whitehorse Service Station, Clothall Road, Baldock.

The acoustic assessment takes account of the existing noise environment, which has been quantified using direct measurement to take account of the effect of the plant referred to above.

Noise control recommendations have been made to meet the likely planning requirements of North Herts Council. The predictions show that the site will be at least 5dB below the typical background noise level at the nearest residential property during operational hours.



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1. Introduction

- 1.1 Ned Johnson Acoustic Consultants Limited has been appointed to undertake an acoustic assessment of the petrol station site at Clothall Road, Baldock.
- 1.2 The development is for the redevelopment of the site with the use remaining as a petrol station. The proposed opening times for the site are Monday – Sunday, 06:00 – 22:00.
- 1.3 In addition to the new fuel pumps and site layout, there will be an Istobal M'WashH3 automatic car wash, jet wash, vacuum and a tyre pump.
- 1.4 The noise levels from the system at the nearest noise-affected properties have been predicted and compared to the likely requirements of North Herts Council using the methodology set-out in BS4142:2014+A1 2019. The likely requirement is that BS4142 rating for the combined plant shall be at least 5dB below the background sound level at the facade of the nearest or most noise affected residential property.

2. Site Description

- 2.1 The development is for the redevelopment of the site as a petrol station with improved layout and services. In addition to new pumps and a new shop, a car wash is proposed, as is a jet wash, car vacuum and tyre pump.
- 2.2 Figure 1 below shows the location of the development; MP1 is the measurement point.

Figure 1.



- 2.3 The measurement point was at ground-floor level and was representative of the sound levels at the receptors. Receptor 4 represents the nearest future receptor of a proposed housing scheme.

2.4 Figure 2 below shows the proposed site layout.

Figure 2.



2.5 The context of the site is that it is a busy location due to the road traffic during the proposed opening times.

2.6 The car wash will be 61 metres from Receptor 1, 25 metres from the garden and nearest window of Receptor 2 (the nearest house façade has no windows), 34 metres from the boundary of Receptor 3 and 60 metres from Receptor 4. The jet wash will be 23 metres from Receptor 1, 67 metres from Receptor 2, 70 metres from Receptor 3 and 15 metres from



Receptor 4. The air and vacuum will be 19 metres from Receptor 1, 70 metres from Receptor 2, 73 metres from Receptor 3 and 11 metres from Receptor 4.

- 2.7 Receptors 1 and 4 will be screened from the car wash by the new shop on site and by a 2-metre boundary fence from the jet wash, air and vacuum. At Receptors 2 and 3 the jet wash, air and vacuum will be screened by buildings on site and at Receptor 3 off site buildings as well.
- 2.8 The main sources of noise in this location are road traffic on the local road network and the commercial repair workshops. As the site plant/equipment (this refers to the car wash, jet wash, air and vacuum) has not been installed data from other sites has been used.
- 2.9 In terms of the sensitivity of the receptor, the receptor is located in a busy location, which does mean that the acoustic environment can be expected to be noisier than would a suburban location. The receptors in this location are not more sensitive due to the period of time when the mechanical plant operates.
- 2.10 With noise control measures the impact of the plant will be reduced to a point where the BS4142 rating will be at least 5dB below the typical 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	23:00 - 07:00
		$L_{Aeq, 16 \text{ hour}}$	$L_{Aeq, 8 \text{ hour}}$
Resting	Living Rooms	35	-
Dining	Dining Area	40	-
Sleeping	Bedrooms	35	30

3.12 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+A1 2019

3.13 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.

3.14 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').

- 3.15 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.

- 3.16 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.”

- 3.17 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.’*
- 3.18 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.



4. Survey Methodology

- 4.1 The survey was conducted on July 7th – July 8th over a 26-hour period. The measurement point can be seen in Figure 1.
- 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 Brüel & Kjær 4231 Acoustic Calibrator producing 94dB_A at 1KHz and no drift was noted in calibration readings. Both calibration results were 94dB_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}. There were some ground works during both mornings covered in the survey that affected the measurements and this data has been excluded.
- 4.5 The measurement procedure in BS4142:2014 was followed. The sound level meter microphone at MP1 was mounted on a tripod at ground-floor level and housed in an outdoor microphone kit. There were no reflecting surfaces, other than the ground, within 3.5 metres. MP1 was representative of the receptors.
- 4.6 During the background survey the temperature was 14°C – 25°C with a wind speed of 0.1 metres per second and no precipitation. Cloud cover was approximately 10%.

5. Noise Survey Results

- 5.1 The typical daytime L_{A90} during the survey was 48dB and the typical ambient was 55dB L_{Aeq} .
- 5.2 Penalties in the BS4142 assessment have been added to the operation of the car wash at Receptors 2 and 3 as the intermittent nature of this item could be audible at receptor gardens. Using the subjective method in BS4142 the car wash does not show tonality and no penalty has been added.
- 5.3 The single exposure level (SEL) measurement has been used and then converted to compare to hourly noise levels of noise from site activities. The following tables present the results for each receptor.

Table 2. Impact of the petrol station at Receptor 1.

Event	Duration	Sound Pressure Levels	Distance to Receptor	Distance Correction	Correction to 1-Hour	Screening Attenuation	L_{Aeq}
Car wash	1800 seconds	75dB _A (at 2m)	61m	-30	-3	-15 (New shop building)	27
Jet wash	1200 seconds	67dB _A	23m	-27	-5	-7 (2m boundary fence)	28
air	600 seconds	66dB _A	19m	-26	-8	-7 (2m boundary fence)	25
vacuum	600 seconds	72dB _A	19m	-26	-8	-7 (2m boundary fence)	31
Total							34

Table 3. Impact of the petrol station at Receptor 2.

Event	Duration	Sound Pressure Levels	Distance to Receptor	Distance Correction	Correction to 1-Hour	Screening Attenuation	L _{Aeq}
Car wash	1800 seconds	75dB _A (at 2m)	25m	-22	-3	-10 (Acoustic Fence)	40
Jet wash	1200 seconds	67dB _A	67m	-37	-5	-15 (new shop)	10
air	600 seconds	66dB _A	70m	-37	-8	-15 (new shop)	6
vacuum	600 seconds	72dB _A	70m	-37	-8	-15 (new shop)	12
Total							40

Table 4. Impact of the petrol station at Receptor 3.

Event	Duration	Sound Pressure Levels	Distance to Receptor	Distance Correction	Correction to 1-Hour	Screening Attenuation	L _{Aeq}
Car wash	1800 seconds	75dB _A (at 2m)	34m	-25	-3	-10 (Acoustic Fence)	37
Jet wash	1200 seconds	67dB _A	70m	-37	-5	-15 (new shop)	10
air	600 seconds	66dB _A	73m	-37	-8	-15 (new shop)	6
vacuum	600 seconds	72dB _A	73m	-37	-8	-15 (new shop)	12
Total							37



Table 5. Impact of the petrol station at Receptor 4.

Event	Duration	Sound Pressure Levels	Distance to Receptor	Distance Correction	Correction to 1-Hour	Screening Attenuation	L _{Aeq}
Car wash	1800 seconds	75dB _A (at 2m)	60m	-30	-3	-15 (New shop building)	27
Jet wash	1200 seconds	67dB _A	15m	-24	-5	-8 (2m boundary fence)	30
air	600 seconds	66dB _A	11m	-21	-8	-11 (2m boundary fence)	26
vacuum	600 seconds	72dB _A	11m	-21	-8	-11 (2m boundary fence)	32
Total							35

5.4 The following tables present the BS4142 assessments for the petrol station.



Table 6. BS4142 assessment for the site at Receptor 1

Results	Measurement	Clause	Commentary
Typical ambient sound level	$L_{Aeq} = 55\text{dB}$	7.3.1	
Typical background sound level	$L_{A90} = 48\text{dB}$	8.3	
Specific sound level of the extraction system at residential window	34dB_A		
Acoustic feature	0dB	9.2	No penalty as intermittency of the site equipment will not be audible above the residual ambient sound environment
Rating level	34dB_A	11	Sound source
Typical background sound level	$L_{A90} = 48\text{dB}$	8.3	
Rating level at receptor point	-14dB	11	
The assessment shows that there is likely to be no adverse impact at receptor point			
Uncertainty of the assessment			The rating level is -14 dB and in this instance the uncertainty of the measurement does not have any significance to the outcome of the assessment.



Table 7. BS4142 assessment for the site at Receptor 2

Results	Measurement	Clause	Commentary
Typical ambient sound level	$L_{Aeq} = 55\text{dB}$	7.3.1	
Typical background sound level	$L_{A90} = 48\text{dB}$	8.3	
Specific sound level of the extraction system at residential window	40dB_A		
Acoustic feature	3dB	9.2	3dB added for intermittent operation of the car wash
Rating level	43dB_A	11	Sound source
Typical background sound level	$L_{A90} = 48\text{dB}$	8.3	
Rating level at receptor point	-5dB	11	
The assessment shows that there is likely to be no adverse impact at receptor point			
Uncertainty of the assessment			The rating level is -5 dB and in this instance the uncertainty of the measurement does not have any significance to the outcome of the assessment.



Table 8. BS4142 assessment for the site at Receptor 3

Results	Measurement	Clause	Commentary
Typical ambient sound level	$L_{Aeq} = 55\text{dB}$	7.3.1	
Typical background sound level	$L_{A90} = 48\text{dB}$	8.3	
Specific sound level of the extraction system at residential garden	37dB_A		
Acoustic feature	3dB	9.2	3dB added for intermittent operation of the car wash
Rating level	40dB_A	11	Sound source
Typical background sound level	$L_{A90} = 48\text{dB}$	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.



Table 9. BS4142 assessment for the site at Receptor 4

Results	Measurement	Clause	Commentary
Typical ambient sound level	$L_{Aeq} = 55\text{dB}$	7.3.1	
Typical background sound level	$L_{A90} = 48\text{dB}$	8.3	
Specific sound level of the extraction system at residential garden	35dB_A		
Acoustic feature	0dB	9.2	No penalty as intermittency of the site equipment will not be audible above the residual ambient sound environment
Rating level	35dB_A	11	Sound source
Typical background sound level	$L_{A90} = 48\text{dB}$	8.3	
Rating level at receptor point	-13dB	11	
The assessment shows that there is likely to be no adverse impact at receptor point			
Uncertainty of the assessment			The rating level is -13 dB and in this instance the uncertainty of the measurement does not have any significance to the outcome of the assessment.



6 Evaluation of results

- 6.1 The impact of the proposed petrol station equipment at Whitehorse Service Station, Clothall Road, has been determined by comparing the measured noise levels with the criteria set out in Section 3 of this report.
- 6.2 The BS4142 assessment shows that the noise from the site equipment, at Receptor 1 is 14dB below the typical background sound level. At Receptor 2 the prediction is 5dB below the typical background sound level, at Receptor 3 the figure is 8dB below the typical background sound level and Receptor 4 is 13dB below the typical background.
- 6.3 The predicted sound pressure level of the site equipment at all receptors will meet with the likely requirements of North Herts Council.
- 6.4 The BS4142 predictions include a 2.5-metre-high acoustic absorptive fence between the car wash and Receptors 2 and 3, which will be necessary to attenuate the sound from the car wash. The fencing must have a minimum mass of 25Kg/m². The site is to have a 2-metre-high fence along the rest of the boundary. It is recommended that the car wash has automatic closing doors while in operation to control sound emissions during the washing and drying process.
- 6.5 A penalty of 3 dB has been added at Receptors 2 and 3 for the operation of the car wash; no penalty has been added for Receptor 1 or Receptor 4 as they are over 60 metres from the car wash and screened by the new shop. The $\frac{1}{3}$ octave data is not available for the site equipment and as it has not been installed it cannot be measured, so an objective assessment for tonality is not possible. Experience of this type of plant at other petrol stations allows a subjective assessment, which shows that the equipment is not tonal and neither is it impulsive and no penalty is required.



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 gHS												
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	<table border="0"> <tr> <td>Manufacturer:</td> <td>ACO</td> <td>SVANTEK</td> </tr> <tr> <td>Model:</td> <td>7152</td> <td>SV18A</td> </tr> <tr> <td>Serial No.:</td> <td>92768</td> <td>155350</td> </tr> <tr> <td>Description:</td> <td>Microphone</td> <td>Preamplifier</td> </tr> </table>	Manufacturer:	ACO	SVANTEK	Model:	7152	SV18A	Serial No.:	92768	155350	Description:	Microphone	Preamplifier
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, Priors Business Park, Bedford, MK44 3WH
T: 01234 639550 W: www.acsoft.co.uk E: sales@acsoft.co.uk

(UP 27/09/2024 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
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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
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CALIBRATION METHOD	Periodic tests were performed in accordance with procedures from IEC 61672-3: 2013.
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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%.
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MEASUREMENT TRACEABILITY	The instrument under test was calibrated using the following equipment: Svanetek SV401 Signal Generator, ACS022, Certificate No. 1148625 Svanetek SV30A Acoustical Calibrator, ACS023, Certificate No. 6397/1 LAB-EL LB-706B Thermo-Barometer, ACS029, Certificate No. 1148624
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NOTES	- 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. - The measurements in this document are traceable to GUM (Central Office of Measures), Poland - 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-17/06/2024 Issue No. 5)



Laboratory Location

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



Certificate of Calibration

Certificate number: 51044

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	94.00	0.01	999.86	0.45
Measurement 2	94.00	0.01	999.86	0.46
Measurement 3	94.00	0.01	999.86	0.45
Result (Average):	94.00	0.01	999.86	0.45
Expanded Uncertainty:	0.1	0.02	1	0.25
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	101.582 ±0.042	22.9 ±0.1	38.5 ±0.9

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: 16/05/2025 Reviewed date: 20/05/2025
Calibration date: 20/05/2025 Issued date: 20/05/2025

Technicians: (Electronic certificate)

Calibrated by: *Michael Tiekner*
Reviewed by: *Lauren Chitty*

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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 various equipment at site will run intermittently but aside from the car wash, this will not be audible in relation to the residual acoustic environment.

The complexity and level of variability of the residual acoustic environment

The residual acoustic environment consists of road traffic noise with some sound from the vehicle repair workshops in the locality. The data provided consistent measurement results during the survey.

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 plant has not yet been installed and therefore no comment can be made.



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 sources have not been installed but the ground conditions between all plant and the receptors is flat, although there will be structures on site blocking line of sight between the receptors and some of the plant.

The number of measurements taken

46 hours of data was collected in 15-minute periods at the quietest time of operation. 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 at both measurement locations.

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 no precipitation and the temperature was a 14°C – 25°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. Uncertainty due to instrumentation is low.

Uncertainty in calculations:

Uncertainty in any measured sound levels used in calculations

It was not possible to measure any of the sound pressure levels for the plant as none has been installed. For this measured data from other sites 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

The plant has not yet been installed and measured data from other sites 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.

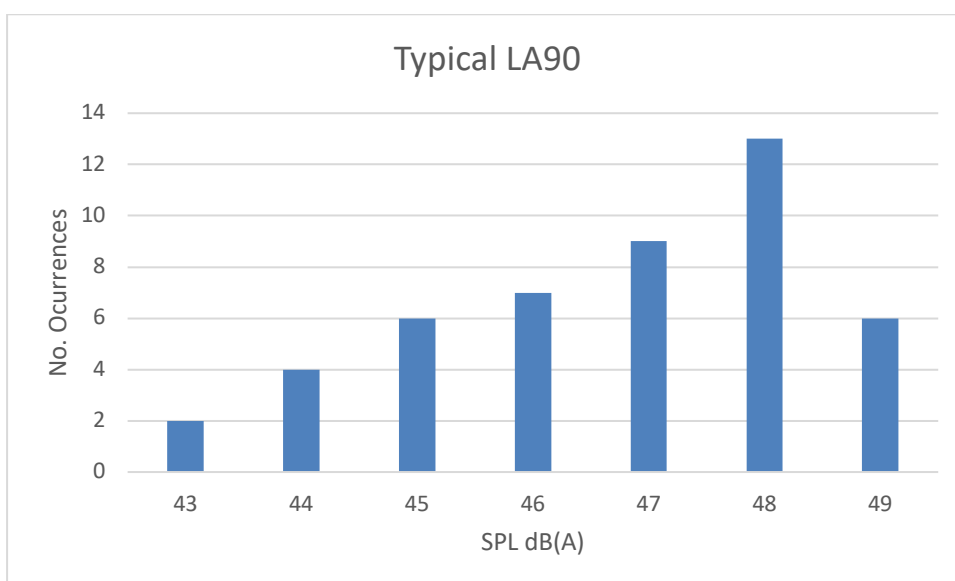
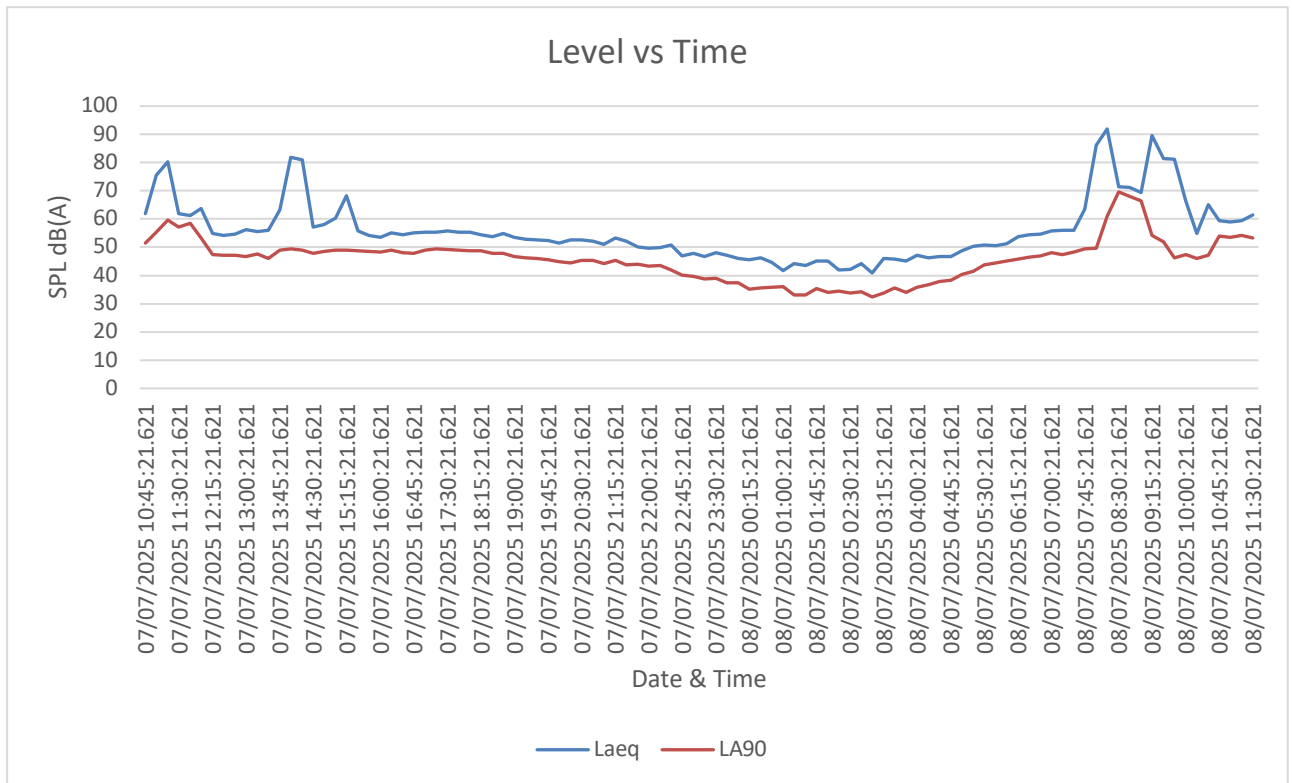
Simplifying the real situation to 'fit' the model (user influence on modelling)

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





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