

LAND AT PENDLE ST EAST, SABDEN
NOISE IMPACT ASSESSMENT

PREPARED FOR:
MR S. WHITEHURST

REPORT REF: BA-25091-RP01-P01

REVISION: P01

DATE: 04/11/2025

PREPARED BY:

BENCHMARK ACOUSTICS LTD

STUDIO 35, HIGHERFORD MILL

BARROWFORD, LANCS

**LAND AT PENDLE ST EAST, SABDEN
NOISE IMPACT ASSESSMENT**

REPORT REF:	BA-25091-RP01-P01
PROJECT:	LAND AT PENDLE ST EAST, SABDEN
	NOISE IMPACT ASSESSMENT
PREPARED FOR:	MR S. WHITEHURST
PREPARED BY:	ALEX TAYLOR Bsc(Hons) MIOA
	PRINCIPAL ACOUSTICS CONSULTANT
	BENCHMARK ACOUSTICS LTD
ISSUED ON:	04/11/2025

DOCUMENT REVISION HISTORY

REVISION	COMMENTS	AUTHOR	ISSUED
P01	Initial issue	AT	04/11/2025

TABLE OF CONTENTS

1.0	EXECUTIVE SUMMARY	1
2.0	SCHEME PROPOSALS	2
3.0	RELEVANT STANDARDS & GUIDANCE	4
3.1	BS8233:2014 'GUIDANCE ON SOUND INSULATION AND NOISE REDUCTION FOR BUILDINGS'	4
3.2	PROPG: PLANNING & NOISE: NEW RESIDENTIAL DEVELOPMENT	5
3.3	APPROVED DOCUMENT O: OVERHEATING	5
3.4	BS 4142:2014+A1:2019 METHODS FOR RATING AND ASSESSING INDUSTRIAL AND COMMERCIAL SOUND	5
3.5	LPA CONSULTATION	6
4.0	SOUND LEVEL MEASUREMENTS	7
4.1	PROJECT SITE DESCRIPTION	7
4.2	EQUIPMENT / INSTRUMENTATION	7
4.3	WEATHER CONDITIONS	8
4.4	METHODOLOGY	8
4.5	MEASUREMENT POSITIONS	8
4.6	MEASURED NOISE LEVELS	10
4.7	DESCRIPTION OF NOISE CLIMATE	10
5.0	NOISE ASSESSMENT	13
5.1	INTERNAL NOISE LEVELS WITHIN DWELLINGS	13
5.2	EXTERNAL NOISE LEVELS IN AMENITY SPACES	15
5.3	NOISE FROM COMMERCIAL FIXED PLANT	15
6.0	APPENDIX I: GLOSSARY OF TERMS	21

1.0 EXECUTIVE SUMMARY

Benchmark Acoustics Ltd has been appointed by Mr S. Whitehurst (*the Client*) to provide a noise assessment for a proposed new bungalow on land rear of Pendle Street East, Sabden (*the Project*).

The proposals are to provide 1 no. two bedroom bungalow to the rear of the existing terrace of houses on Pendle Street East by developing part of the current residential garden of number 19 Pendle Street East.

This report has been produced to review the sound insulation requirements of the Project and to assess the potential impact from fixed plant noise associated with the nearby automotive restoration garage, Specialised Automotive Services (*the SAS garage*), as requested by Ribble Valley Borough Council (*RVBC*).

Noise levels have been measured at the location of the proposed new bungalow and at locations close to items of fixed plant at the SAS garage.

Suitable sound insulation performance specifications have been recommended for the glazing and ventilation elements of the proposed new bungalow to achieve the BS8233:2014 internal ambient noise limits for dwellings.

Noise levels in the external garden and patio areas of the Project have been assessed and are expected to achieve the BS8233:2014 recommended noise levels for external amenity areas without any additional mitigation measures.

Noise levels associated with the SAS garage fixed plant have been assessed in accordance with the BS4142 (2014)+A1:2019 methodology, and are expected to have a low impact on the Project, given the context.

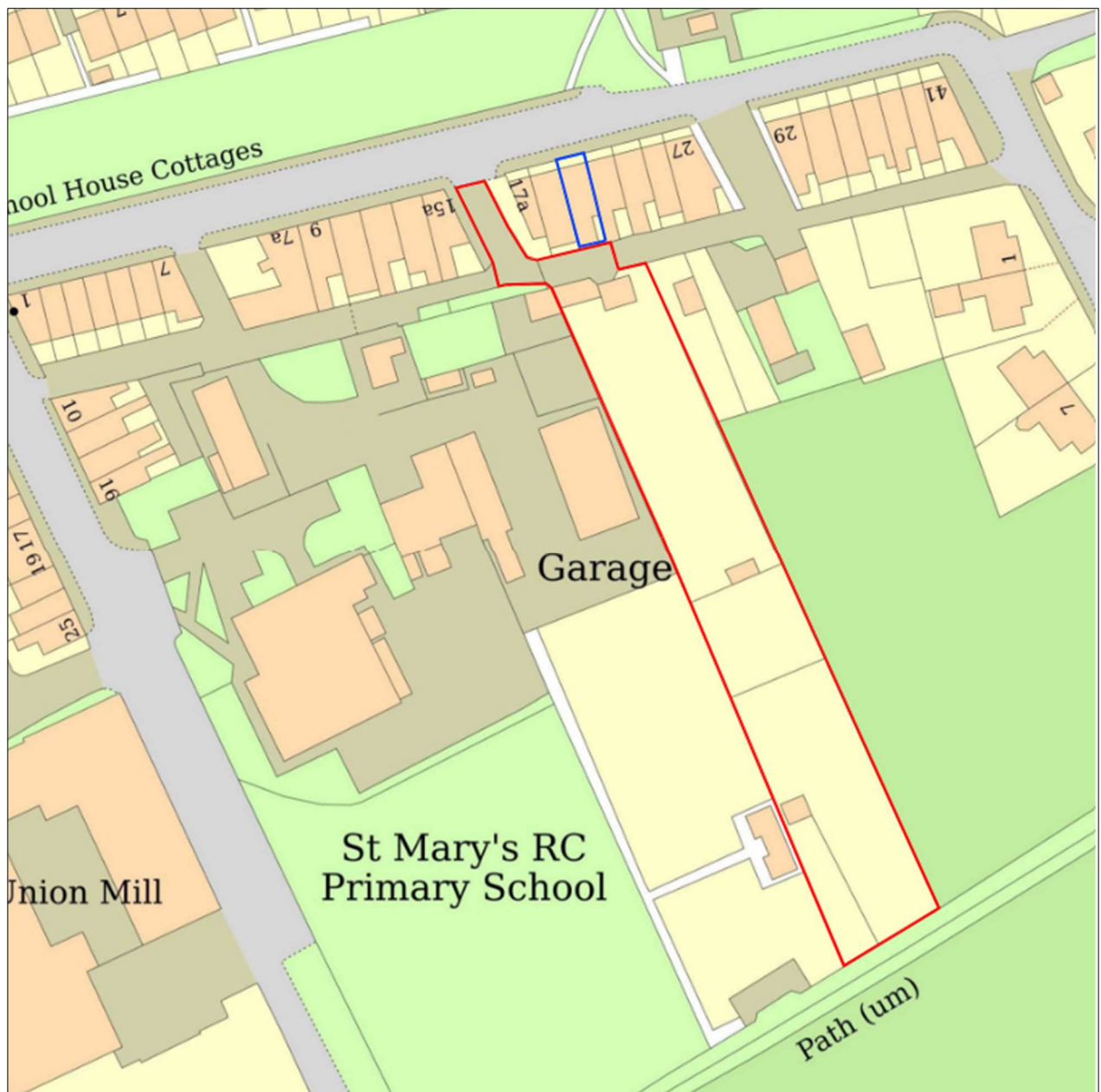
Based on the results of the noise assessment, it is considered that noise should not be a determining factor in granting planning consent for the proposed development.

2.0 SCHEME PROPOSALS

The Project site is located at the rear of Pendle Street East, Sabden as shown in Figure 1, below.

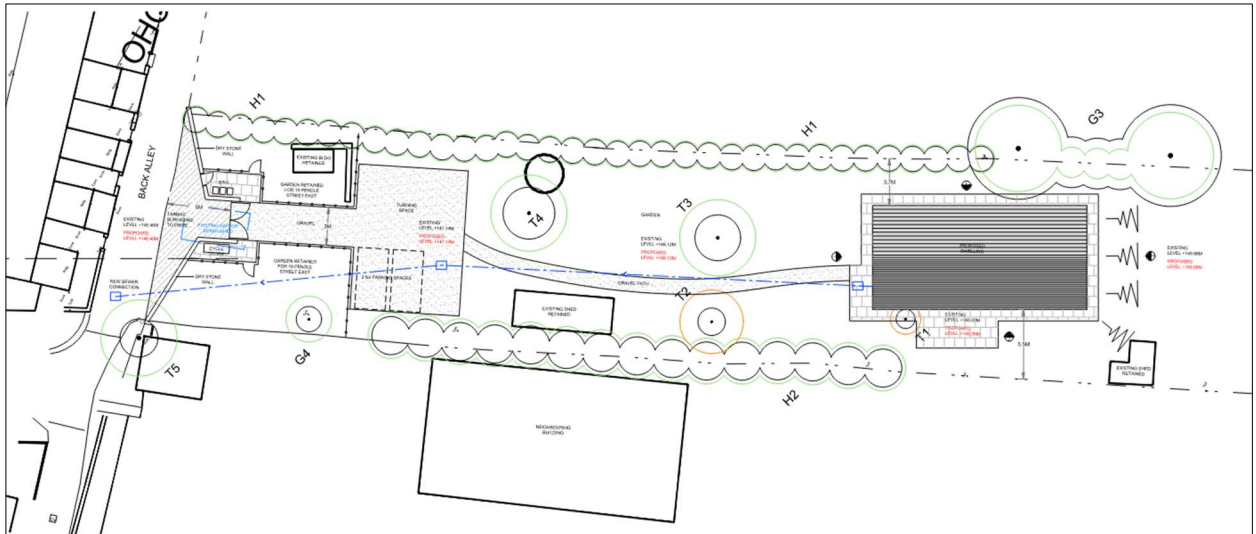
The proposals are to provide 1 no. two bedroom bungalow to the rear of the existing terrace of houses on Pendle Street East by developing part of the current residential garden of number 19 Pendle Street East. A suitably sized garden area for number 19 Pendle Street East will be retained within the northern section of the site.

Figure 1: Location plan



The proposed site plan is shown in Figure 2, below.

Figure 2: Proposed site plan



3.0 RELEVANT STANDARDS & GUIDANCE

3.1 BS8233:2014 ‘GUIDANCE ON SOUND INSULATION AND NOISE REDUCTION FOR BUILDINGS’

3.1.1 INTERNAL NOISE LEVELS WITHIN DWELLINGS

British Standard BS 8233:2014 ‘*Guidance on sound insulation and noise reduction for buildings*’ (BS8233) provides guidance on recommended internal ambient noise levels within dwellings. BS8233 states that in general, for steady external noise sources, it is desirable that the internal ambient noise levels within dwellings do not exceed the guideline values in the table below.

Table 1: BS8233 desirable internal ambient noise limits for dwellings

Activity	Location	07:00 – 23:00 hrs	23:00 – 07:00 hrs
Resting	Living Room	35 dB LAeq,16hr	-
Dining	Dining room/area	40 dB LAeq,16hr	-
Sleeping (daytime resting)	Bedroom	35 dB LAeq,16hr	30 dB LAeq,8hr

BS8233 comments that where development is considered necessary or desirable ‘...*the internal target levels may be relaxed by up to 5 dB and reasonable internal conditions still achieved.*’

With regard to the potential for sleep disturbance from individual events, BS8233 does not provide any guideline noise limits, but notes that:

‘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 LAmax,F, depending on the character and number of events per night. Sporadic noise events could require separate values.’

3.1.2 EXTERNAL NOISE LEVELS IN AMENITY SPACES

With regard to external noise BS8233 states that ‘*for traditional external areas that are used for amenity space, such as gardens and patios, it is desirable that the external noise level does not exceed 50 dB LAeq,T, with an upper guideline value of 55 dB LAeq,T which would be acceptable in noisier environments..*’

BS8233 recognises that the guideline values may not be achievable in all circumstances where development might be desirable and states that ‘...*In higher noise areas, such as city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces, but should not be prohibited.*’

3.2 PROPG: PLANNING & NOISE: NEW RESIDENTIAL DEVELOPMENT

ProPG: Planning & Noise '*Professional Practice Guidance on Planning and Noise: New Residential Development*' (ProPG) was produced in 2017 to provide practitioners with guidance on a recommended approach to the management of noise within the planning system in England.

The guidance has been developed by a Working Group consisting of representatives of the Association of Noise Consultants (ANC), Institute of Acoustics (IOA) and Chartered Institute of Environmental Health (CIEH), together with practitioners from a planning and local authority background, and aims to encourage better acoustic design for new residential development and to protect people from the harmful effects of noise.

ProPG notes that '*...It is considered that suitable guidance on internal noise levels can be found in "BS8233:2014: Guidance on sound insulation and noise reduction for buildings"*'.

With regard to the potential for sleep disturbance from individual events, ProPG states that:

'...it is considered that if, in bedrooms at night, the $L_{Amax,F}$ from individual noise events (from all sources) would not normally exceed 45dB more than 10 times a night, then this represents a reasonable threshold below which the effects of individual noise events on sleep can be regarded as negligible...'

3.3 APPROVED DOCUMENT O: OVERHEATING

Approved Document O (AD-O) covers the overheating mitigation requirements of the building regulations and contains standards relating to noise at night, pollution, security, protection from falling and protection from entrapment.

With regard to noise, paragraph 3.2 of AD-O states:

3.2 In locations where external noise may be an issue (for example, where the local planning authority considered external noise to be an issue at the planning stage), the overheating mitigation strategy should take account of the likelihood that windows will be closed during sleeping hours (11pm to 7am).

Paragraph 3.3 of AD-O objectively defines when relying on opening windows to remove excess heat does not comply with the requirement to take account of noise at night, stating that:

3.3 Windows are likely to be closed during sleeping hours if noise within bedrooms exceeds the following limits.

- a. 40dB $L_{Aeq,T}$, averaged over 8 hours (between 11pm and 7am).*
- b. 55dB L_{AFmax} , more than 10 times a night (between 11pm and 7am).*

3.4 BS 4142:2014+A1:2019 METHODS FOR RATING AND ASSESSING INDUSTRIAL AND COMMERCIAL SOUND

British Standard BS 4142:2014+A1:2019 '*Methods for rating and assessing industrial and commercial sound*' (BS4142) provides a method for assessing noise from items such as building services plant and loading and unloading of goods at industrial and/or commercial premises, when compared to the existing background sound levels at the noise sensitive receptor.

The assessment procedure involves measuring or predicting the 'rating level' of the sound source and comparing it to the 'background noise level' at the location of the noise sensitive receptor. The rating level is the level of the specific sound under consideration plus any adjustment for the characteristic features of the sound such as tonality, impulsivity, and intermittency.

BS 4142 comments that '*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*' and goes on to state that:

- 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.

BS4142 notes that adverse impacts include, but are not limited to, annoyance and sleep disturbance, and that not all adverse impacts will lead to complaints and not every complaint is proof of an adverse impact.

3.5 LPA CONSULTATION

Ribble Valley Borough Council (RVBC) has provided the following comments regarding the noise assessment:

The applicant needs to provide a noise evaluation from the nearby industrial buildings to determine a fully detailed scheme for the sound insulation of the residential buildings against internally and externally generated noise.

The sound insulation works shall be engineered so the dB levels within the residential buildings adhere to the levels shown in Table 4 on page 24 of the publication 'BS8233:2014, Guidance on Sound Insulation and Noise Reduction for Buildings' or its subsequent amendments. The design criteria for external noise shown in this document also need to be adhered to (see para 7.7.3.2, page 25).

The outdoor areas shall not be affected by fixed plant noise from the industrial areas by more than 3dB(A) between the hours of 07:00 -23:00 (taken as a 60 minute L_{A90} at the nearest sound sensitive development) and shall not exceed the existing background sound level between 23:00-07:00 (taken as a 15 minute L_{A90} at the nearest sound sensitive development)

All measurements shall be made in accordance with the methodology of BS4142 (2014)+A1:2019 (Methods for rating and assessing industrial and commercial sound) and/or its subsequent amendments.

Measurements shall be undertaken at an appropriate location and corrected to establish the noise levels at the nearest sound sensitive property being developed.

4.0 SOUND LEVEL MEASUREMENTS

A series of attended and unattended sound level surveys were undertaken to determine the prevailing noise levels around the site and to measure noise emissions from the SAS garage fixed plant during the following dates and times:

- Thursday 25/09/2025, 14:15 – 17:34 hrs
- Friday 26/09/2025, 09:35 – 12:23 hrs
- Monday 29/09/2025, 15:17 – 00:02 hrs
- Tuesday 30/09/2025, 00:02 – 11:02 hrs
- Friday 31/10/2025, 09:35 – 10:30 hrs

Details of the sound level measurements are presented in the following sections.

4.1 PROJECT SITE DESCRIPTION

The Project site is located in a predominantly rural setting. To the north of the site is Pendle Street East, a row of residential properties. To the north-west of the site is an automotive restoration garage complex, Specialised Automotive Services ('SAS' garage) which undertakes vintage and classic car restoration, auto electrical work, and repair and maintenance work (marked by 'Garage' on the Location Plan). To the west of the site, adjacent to the SAS garage, is St Mary's RC Primary school. To the south of the site lies a public footpath with open fields beyond. To the east is open land subject to the Committed Site housing scheme for 17 new homes in the Local Plan.

The site location is shown in Figure 1, above.

4.2 EQUIPMENT / INSTRUMENTATION

The following equipment was used for the sound level measurements.

Table 2: Summary of noise survey measurement equipment

Equipment	Model	Serial No.	Lab Calibration Date
Sound Level Meter	NTi XL2-TA	A2A-10831-E0	16/09/2024
Preamplifier	NTi MA220	5628	16/09/2024
Microphone	NTi MC230	9033	16/09/2024
Sound Level Meter	Rion NA-28	00170250	14/03/2025
Preamplifier	Rion NH-23	80932	14/03/2025
Microphone	Rion UC-59	01054	14/03/2025
Calibrator	Larson Davis CAL200	13371	10/09/2025

4.3 WEATHER CONDITIONS

The following weather conditions were noted during the survey. The weather conditions were considered to be suitable for noise measurements across the survey periods.

Table 3: Summary of weather conditions during the noise surveys

Date	Time	Weather conditions
Thu 25/09/2025	14:15 – 17:34 hrs	Dry and sunny with cloud cover ranging between 0 - 10% Temperature 17°C - 18°C, Wind speeds 0 – 2.0 m/s
Fri 26/09/2025	09:35 – 12:23 hrs	Dry and sunny with cloud cover ranging between 0 - 40% Temperature 14°C - 17°C, Wind speeds 0 – 1.5 m/s
Mon 29/09/2025*	15:17 – 00:02 hrs	Dry. Temperature 7°C - 15°C, Wind speeds 0 – 1.0 m/s
Tue 30/09/2025*	00:02 – 11:02 hrs	Dry. Temperature 7°C - 15°C, Wind speeds 0 – 1.5 m/s
Fri 31/10/2025	09:35 – 10:30 hrs	Dry, overcast, with cloud cover ranging between 70 - 90% Temperature 14°C, Wind speeds 0 – 1.5 m/s

* Unattended survey: weather data obtained from nearby weather station ID IBURNL15, via www.wunderground.com

4.4 METHODOLOGY

All measurements were undertaken by a Suitably Qualified Acoustician holding full membership of the Institute of Acoustics (MIOA).

Measurements were undertaken in accordance with the principles of BS 7445: 2003: '*Description and measurement of environmental noise*' with a sound level meter mounted on a tripod at a height of approximately 1.4 m.

The sound level meter was field calibrated prior to the start and after the end of each survey with no significant drift in sensitivity observed.

4.5 MEASUREMENT POSITIONS

Figure 3 below illustrates the approximate location of the measurement positions.

A description of the measurement positions and the observed noise sources is provided in Table 4, below.

Figure 3: Approximate locations of measurement positions

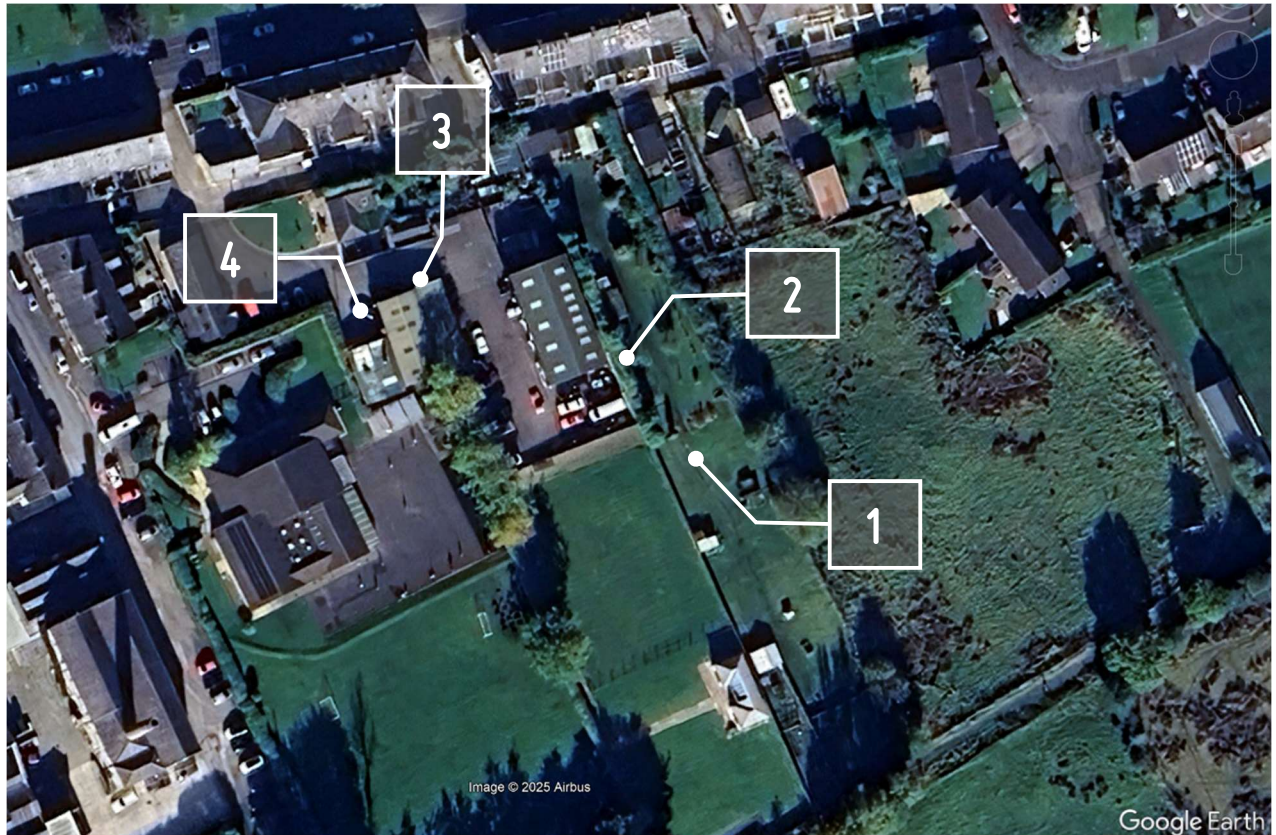


Image copyright Airbus / Google Earth

Table 4: Description of measurement positions and observed noise sources

Pos	Description
1	<p>Located in the garden of 19 Pendle St East at the approximate mid-point of the western elevation of the proposed bungalow, ~5.5 m from western site boundary, and ~23.5 m from the closest facade of the SAS garage buildings.</p> <p>Measurements of the prevailing noise levels, and sample measurements of the SAS garage spray booth extract flue fixed plant noise levels, at the location of proposed bungalow.</p>
2	<p>Located in the garden of 19 Pendle St East, ~2.8 m from western site boundary, and ~4.6 m from the closest facade of the SAS garage building.</p> <p>Sample measurement for the SAS garage combi boiler flue fixed plant noise levels.</p>
3	<p>Located ~1 m outside the open roller shutter door entrance to the SAS garage body shop.</p> <p>Sample measurement for the SAS garage body shop compressor fixed plant noise levels.</p>
4	<p>Located ~6 m from the front of the spray booth building.</p> <p>Sample measurement for the SAS garage spray booth extract flue fixed plant noise levels.</p>

4.6 MEASURED NOISE LEVELS

A summary of the measured noise levels is provided in Table 5 and Table 6 below.

Table 5: Summary of measured noise levels in garden of 19 Pendle St East

Pos	Date	Period, T	L _{Aeq,T} dB	L _{Aeq,15min} dB	L _{A90,15min} dB	L _{AFmax,15min} dB
1	Thu 25/09/25	14:15 – 16:30	47	40 - 53	35 - 42	54 - 67
1	Thu 25/09/25	16:34 – 17:34	45	42 - 48	38 - 39	58 - 65
1	Fri 26/09/25	09:35 – 11:05	50	47 - 54	39 - 42	61 - 69
2	Fri 26/09/25	11:06 – 11:36	47	46 - 47	40 - 41	62 - 63
1	Fri 26/09/25	11:38 – 12:23	48	47 - 49	41 - 43	63 - 63
1	Mon 29/09/25*	15:17 – 23:02	43	32 - 48	28 - 38	43 - 75
1	Mon 29/09/25*	23:02 – 07:02	39	27 - 49	25 - 37	35 - 74
1	Tue 30/09/25*	07:02 – 11:02	47	43 - 49	35 - 43	60 - 77

* unattended noise surveys

Table 6: Summary of measured SAS garage fixed plant noise levels

Pos	Date	Period, T	L _{Aeq,T} dB	L _{Aeq,30s} dB	L _{A90,30s} dB	L _{AFmax,30s} dB
3	Tue 30/09/25	10:48:52 – 10:49:09	63	-	-	-
4	Tue 30/09/25	10:54:38 – 10:55:10	55	-	-	-
2	Fri 31/10/25	09:35:38 - 09:37:08	-	45 - 46	44 - 45	47 - 57
4	Fri 31/10/25	10:24:42 - 10:26:14	-	55 - 56	54 - 55	57 - 60
1	Fri 31/10/25	10:28:02 - 10:36:02	-	42 - 47	40 - 43	47 - 60

4.7 DESCRIPTION OF NOISE CLIMATE

The following observations of the noise climate at each measurement position were noted during the attended surveys. Note that noise from birdsong and distant traffic was observed to be present throughout the duration of each the attended noise surveys however, for brevity, these noise sources have not been noted in the observation comments for each measurement.

Table 7: Summary of observations at each measurement position (measurement period T = 15 mins)

Pos	Date	Time	L _{Aeq,T} dB	L _{A90,T} dB	L _{AFmax,T} dB	Observed noise sources
1	25/09/2025	14:15	43	40	57	School yard*
1	25/09/2025	14:30	49	42	65	School yard*, aircraft
1	25/09/2025	14:45	45	36	62	School yard*, occasional activity from SAS garage (bang/clatter)

Pos	Date	Time	L _{Aeq,T} dB	L _{A90,T} dB	L _{AFmax,T} dB	Observed noise sources
1	25/09/2025	15:00	40	37	62	Distant dog barking, trees rustling
1	25/09/2025	15:15	40	35	54	Occasional activity from garage (bang/clatter), intermittent distant hedge trimmer (or similar)
1	25/09/2025	15:30	44	40	60	Children leaving school, car movements, engine idling and talking on SAS garage car park, distant construction activity
1	25/09/2025	15:45	44	41	61	Occasional activity from garage (bang/clatter), car movement, engine idling, revving and talking on SAS garage car park, aircraft
1	25/09/2025	16:00	46	40	67	Engine idling, revving and talking on SAS garage car park. Intermittent attempts to start an old Landrover on garage car park (engine turns over but does not start)
1	25/09/2025	16:15	53	38	66	Talking on SAS garage car park. Intermittent attempts to start an old Landrover on SAS garage car park (engine turns over but does not start). Landrover engine starts with engine ticking over and loud revving
1	25/09/2025	16:34	48	38	65	Landrover engine ticking over and revving on SAS garage car park then stops
1	25/09/2025	16:49	42	39	60	Distant dogs barking
1	25/09/2025	17:04	44	38	58	Distant dogs barking, aircraft
1	25/09/2025	17:19	44	38	61	-
1	26/09/2025	09:35	54	42	69	School yard*, teacher's whistle, helicopter passes directly overhead
1	26/09/2025	09:50	48	40	61	School yard*, distant roadworks/construction activity, distant leaf blower or similar, aircraft, church bells
1	26/09/2025	10:05	48	41	61	School yard*, distant roadworks/construction activity
1	26/09/2025	10:20	47	40	63	School yard*, engine running or plant noise just audible, talking in distance, dog barking
1	26/09/2025	10:35	48	40	68	School yard*, school bell, plant noise from SAS garage just audible, distant roadworks/construction activity
1	26/09/2025	10:50	50	39	66	School yard*, school bell
2	26/09/2025	11:06	47	40	62	School yard*, aircraft, occasional activity from garage (bang/clatter)
2	26/09/2025	11:21	46	41	63	Car engine revving from SAS garage
1	26/09/2025	11:38	47	41	63	School yard*, car engine revving from SAS garage, talking on garage car park, helicopter, aircraft
1	26/09/2025	11:53	47	41	63	Car movement and talking on SAS garage car park, engine revving from garage, distant mower or similar, school bell and School yard* toward end of measurement
1	26/09/2025	12:08	49	43	63	School yard*, distant mower or similar

* Children playing/shouting in the nearby school yard

Table 8: Summary of observations for SAS garage fixed plant noise measurements

Pos	Date	Time	L _{Aeq,T} dB	L _{A90,T} dB	Comments
3	Tue 30/09/25	10:48:52 to 10:49:09	63	61	Compressor noise emissions measured outside of body shop open roller shutter door entrance. Additional noise contributions from background radio.
4	Tue 30/09/25	10:54:38 to 10:55:10	55	54	Extract flue noise emissions from spray booth measured in front of spray booth. Additional noise contributions from children playing in adjacent school yard.
2	Fri 31/10/25	09:35:38 to 09:37:08	L _{Aeq,30s} 45 - 46	L _{A90,30s} 44 - 45	Combi boiler flue noise emissions measured in garden of 19 Pendle St East whilst boiler was operational. Additional noise contributions from birdsong in garden.
4	Fri 31/10/25	10:24:42 to 10:26:14	L _{Aeq,30s} 55 - 56	L _{A90,30s} 54 - 55	Extract flue noise emissions from spray booth measured in front of spray booth.
1	Fri 31/10/25	10:28:02 to 10:36:02	L _{Aeq,30s} 42 - 47	L _{A90,30s} 40 - 43	Extract flue noise emissions from spray booth measured at location of proposed bungalow. Additional noise contributions from birdsong in garden, distant traffic, occasional aircraft, and dog barking.

5.0 NOISE ASSESSMENT

5.1 INTERNAL NOISE LEVELS WITHIN DWELLINGS

Noise break-in calculations have been undertaken based on the measured external noise levels at the site and the proposed building dimensions, to assess the building envelope sound insulation performance required to achieve the BS8233 recommended internal noise levels within dwellings.

Building dimensions have been taken from the aw+a architects drawing ‘Proposed floor plans and Elevations’ ref 24-045 PL04 Rev A.

The octave band L_{eq} noise levels used for the noise break-in calculations, as measured during the attended and unattended noise surveys, are summarised in Table 9 below for reference. The octave band L_{eq} values from the daytime survey period with the highest overall $L_{Aeq,T}$ (50 dB $L_{Aeq,T}$ measured between 09:35 – 11:05 hrs on Fri 26/09/25) have been used to provide a robust worst-case assessment of daytime noise levels.

Table 9: Measured external noise levels used to assess building envelope sound insulation requirements

Octave Band Centre Frequency, Hz	63	125	250	500	1k	2k	4k	A
Daytime $L_{eq,T}$ (dB) Survey period with highest measured $L_{Aeq,T}$ (09:35 - 11:05)	54	50	45	44	46	42	40	50
Night-time $L_{eq,T}$ (dB) Log average over night-time survey periods (23:02 – 07:02)	42	34	31	30	30	27	34	39
Night-time $L_{AFmax,15min}$ (dB) 2 nd highest value (23:02 – 07:02)	59	53	48	47	51	56	66	67

The following indicative building envelope constructions and associated sound insulation performance have been assumed for the purposes of this assessment, based on information received from aw+w architects:

- *Roof: Natural slate roof with mineral wool insulation in ceiling void and plasterboard ceiling*
- *External walls: Cavity blockwork walls formed from 100mm dense blockwork incorporating PIR insulation in cavity and external timber cladding on battens*

The following sections summarise the sound insulation specifications required for the glazing and ventilation elements to achieve the BS8233 recommended internal noise levels within dwellings.

5.1.1 EXTERNAL WINDOWS SOUND INSULATION REQUIREMENTS

The noise break-in calculations indicate that the following external window minimum sound insulation specifications will be required to achieve the BS8233 recommended internal noise levels within dwellings.

Table 10: Minimum recommended external window sound insulation performance

Octave Band Centre Frequency, Hz	63	125	250	500	1k	2k	4k	$R_w + C_{tr}$
Minimum sound insulation (SRI), dB	23	20	23	33	42	39	40	30

Note that the recommended minimum sound insulation specifications above relate to the complete window assembly, including the frame and seals, and a window assembly area of at least 1.8 m².

For guidance, it is expected that the above sound insulation performance requirements could be achieved with suitably specified 6/18/4mm DGU windows, however the window manufacturer/supplier shall be responsible for demonstrating compliance with the minimum window sound insulation performance requirements, e.g. by providing suitable laboratory test reports.

5.1.2 VENTILATION SOUND INSULATION REQUIREMENTS

The noise break-in calculations indicate that the following minimum sound insulation specifications will be required for background ventilators to achieve the BS8233 recommended internal noise levels within dwellings.

Table 11: Minimum recommended combined background ventilation sound insulation performance

Octave Band Centre Frequency, Hz	63	125	250	500	1k	2k	4k	$D_{n,e,w} + C_{tr}$
Minimum sound insulation ($D_{n,e}$), dB	32	27	33	28	30	28	27	29

Note that the combined ventilator performance must achieve the Building Regulations Approved Document F background ventilation rates whilst achieving the $D_{n,e}$ sound insulation performance values outlined in Table 11 above. Where more than one ventilator per room is required, the minimum $D_{n,e}$ values above will need to be increased to offset the loss in performance associated with the use of multiple units (i.e. by +3dB where 2 no. vents are required, +5dB where 3 no. vents are required, etc).

The ventilator manufacturer/supplier shall be responsible for demonstrating compliance with the minimum ventilator sound insulation performance requirements, e.g. by providing suitable laboratory test reports. For guidance, it is expected that the above sound insulation performance requirements would be achieved with standard non-acoustic trickle vents.

5.1.3 OVERHEATING AND NOISE

Whilst compliance with the overheating requirements of AD-O is a building regulations matter rather than a planning requirement, it would be prudent to consider options for compliance with AD-O prior to obtaining planning permission, given the means of removing excess heat has the potential to affect the building appearance and/or shape or form, and may have cost implications during the later design stages.

An indicative assessment, assuming an outside-to-inside level difference of 10 dB for window openings with a free area equivalent to 4% of the floor area of the bedrooms (as required to satisfy the AD-O

simplified assessment method for 'medium' risk locations), and using the 4th highest measured night-time $L_{A_{Max,15min}}$ of 60 dB, predicts internal noise levels of 29 dB $L_{A_{eq,8hr}}$ and 50 dB $L_{A_{Fmax,15min}}$ within bedrooms between 23:00 – 07:00 hrs.

Based on the indicative simplified assessment outlined above, it is expected that the use of openable windows for controlling overheating could achieve the AD-O noise limits referenced in section 3.3 above.

5.2 EXTERNAL NOISE LEVELS IN AMENITY SPACES

The highest measured $L_{A_{eq,T}}$ across the daytime survey periods (09:35 - 11:05 hrs) was $L_{A_{eq,T}}$ 50 dB which achieves the BS8233 recommendation that *'...for traditional external areas that are used for amenity space, such as gardens and patios, it is desirable that the external noise level does not exceed 50 dB $L_{A_{eq,T}}$, with an upper guideline value of 55 dB $L_{A_{eq,T}}$ which would be acceptable in noisier environments..'*

As such no additional mitigation measures are required to control external noise levels in external amenity areas.

5.3 NOISE FROM COMMERCIAL FIXED PLANT

Discussions with the proprietor of the SAS garage indicate that the items of fixed plant associated with the garage operations are as follows:

- Extract fan with roof mounted flue on the spray booth building
- Compressor located in the body shop building
- Combi boiler flue located at high level on the workshop building

The locations of the SAS garage buildings containing the items of fixed plant noted above are identified in Figure 4 below.

The proprietor of the SAS garage has confirmed that fixed plant is not operational outside of the garage opening hours, which we understand are 08:00 – 17:30 hrs, Monday - Friday.

5.3.1 FIXED PLANT SOUND EMISSION LEVELS

Sound emission levels from the items of fixed plant have been measured as reported in section 4.0 above.

A combination of site noise level measurements, distance attenuation calculations, and 3D noise modelling utilising the ISO 9613-2:2024 (*Acoustics - Attenuation of sound during propagation outdoors, Part 2: Engineering method for the prediction of sound pressure levels outdoors* methodology) calculation methodology have been used to predict the specific noise levels expected from the fixed plant at the location of the proposed new bungalow.

The predicted sound levels from the SAS fixed plant noise levels are summarised in Table 12 below.

Table 12: Summary of predicted fixed plant noise levels at location of proposed new bungalow

SAS garage fixed plant item	L _{Aeq,T} dB	On time	L _s dB	Comments
Spray booth extract fan/flue	40	100%	40	<p>The lowest L_{A90,30s} value measured at the location of the proposed bungalow when the spray booth extract was operating has been used as a worst-case estimate of the spray booth extract noise contribution as the specific sound source noise was constant and the ambient sound level (L_{Aeq}) was affected by contributions from birdsong in the garden and other background noise sources.</p> <p>Worst-case assessment assumes spray booth extract is operational for 100% of assessment period, i.e. no correction for on time.</p>
Body shop compressor	24	25%	18	<p>Indicative noise modelling prediction based on the measured L_{Aeq} at the open roller shutter entrance with compressor operating. Modelling prediction includes noise break-out contributions from 2 open roller shutter doors and noise break-out from assumed insulated metal cladding roof/wall constructions of the body shop building.</p> <p>On time of 25% is expected to be worst-case based on comments from body shop staff, i.e. -6dB correction for on time.</p>
Workshop combi boiler flue	36	50%	33	<p>Distance corrected measured L_{A90,30s} value used to determine combi boiler flue noise contribution as the specific sound source noise was constant and the ambient sound level (L_{Aeq}) was affected by contributions from birdsong in the garden.</p> <p>Indicative on time of 50% of assessment period, i.e. -3dB correction for on time.</p>
Combined fixed plant noise	-	-	41	<p>Specific sound level from all fixed plant contributions, including corrections for on time</p>

Figure 4: Locations of SAS garage buildings containing items of fixed plant

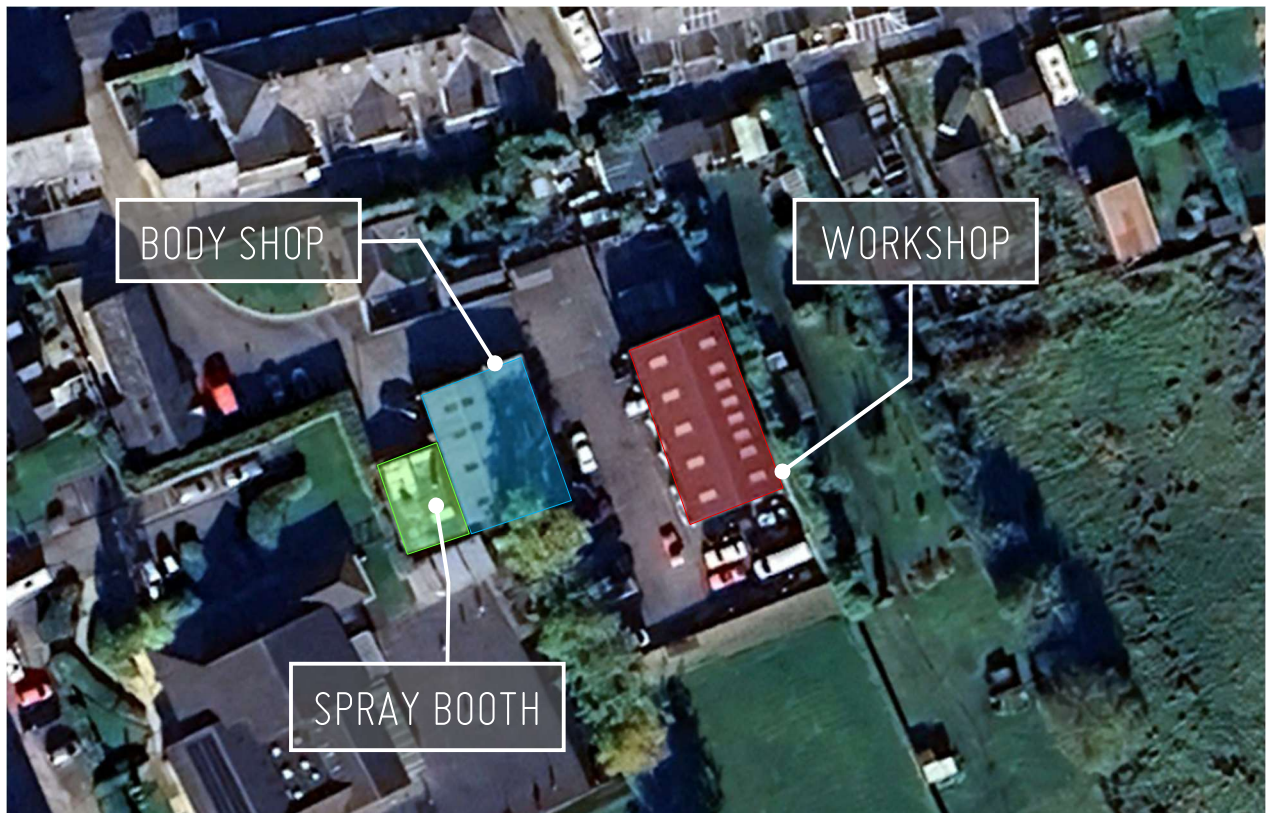
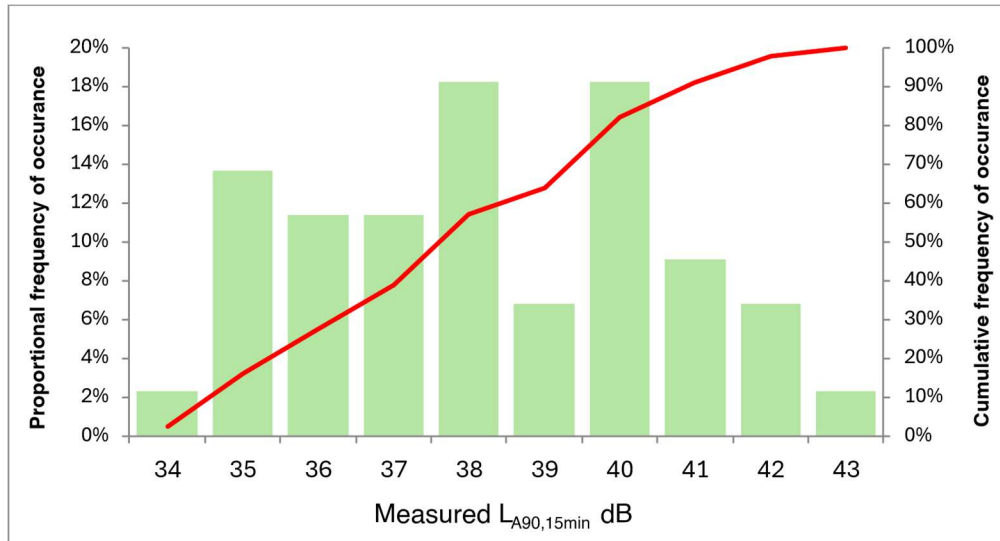


Image copyright Airbus / Google Earth

5.3.2 BACKGROUND NOISE LEVELS (L_{A90})

A statistical analysis of the measured background noise levels during the operating hours of the SAS garage from both attended and unattended measurement surveys is presented in Table 13 below.

Table 13: Statistical analysis of measured background noise levels between 08:00 - 17:30 hrs



The following sources were observed to be the main contributors to background noise levels at the site:

- Birdsong
- Children playing in the nearby schoolyard
- Distant traffic

Whilst it is possible that fixed plant associated with the SAS garage may have been operational during the attended noise survey periods, fixed plant noise was typically not audible at the location of the proposed new bungalow (i.e. measurement position 1).

On the two occasions when plant noise was noted to be just audible above other background noise sources, the measured background noise level was $L_{A90,15min}$ 40 dB (refer to Table 7 above). These observations would appear to correlate with the measured sound levels presented in section 4.6 above, where the lowest background sound level measured when the spray booth extract fan was known to be operational was $L_{A90,30s}$ 40 dB (noting that the spray booth extract fan is predicted to be the dominant source of any fixed plant noise contributions, as outlined in Table 12 above)

Background noise levels measured outside of the operating hours of the SAS garage have been compared to the statistical analysis of the background noise levels measured during the operating hours to further assist in determining a representative background noise level at measurement position 1 in the absence of contributions from fixed plant.

Table 14 summarises the mean average $L_{A90,15min}$ measured during the unattended measurement periods 07:32–08:32, and 17:32–18:32 hrs (i.e. one hour immediately before and after the SAS garage operating hours), and the mean average of all $L_{A90,15min}$ measurements during the measurement periods 08:32 – 17:32 hrs (i.e. during the SAS garage operating hours), rounded to the nearest integer.

Table 14: Mean average measured background noise levels at position 1

Measurement Position	Period	Average $L_{A90,15min}$ dB
1	07:32 - 08:32, and 17:32-18:32	38
1	08:32 - 17:32 hrs	38

Based on the analysis above, $L_{A90,T}$ 38 dB has been assumed to be representative of the daytime background noise level in the absence of any contributions from fixed plant noise from the SAS garage.

5.3.3 BS4142 ASSESSMENT

The noise impact from the SAS garage fixed plant has been assessed at the location of the proposed new bungalow based on the representative background noise level determined in section 5.3.2 and the predicted specific sound emission levels of the fixed plant as summarised in section 5.3.1 above.

As summary of the BS4142 assessment is presented in Table 15 below.

Table 15: Summary of BS4142 assessment for SAS garage fixed plant

Results		Comments
Reference time interval	1 hr	Reference time is 1 hr during daytime
Background sound level ($L_{A90,15min}$), dB	38	Refer to section 5.3.2
Specific sound level ($L_{Aeq,1hr}$), dB	41	Refer to section 5.3.1
Acoustic feature correction, dB	0	No corrections applied
Rating Level, ($L_{Ar,Tr}$), dB	41	
Excess of rating level over background sound level, dB	+3	Initial estimate of impact

The BS4142 initial assessment indicates that noise from the SAS garage fixed plant is not expected to exceed the background noise at the location of the proposed new bungalow by more than +3 dB during the garage operating hours of 08:00 – 17:30 hrs.

As no fixed plant is expected to be operational outside of the SAS garage opening hours, the following RVBC assessment criterion is expected to be achieved:

'The outdoor areas shall not be affected by fixed plant noise from the industrial areas by more than 3dB(A) between the hours of 07:00 -23:00 (taken as a 60 minute L_{A90} at the nearest sound sensitive development) and shall not exceed the existing background sound level between 23:00-07:00'

The predicted excess of rating level over background sound level of +3dB is below the '*difference of around +5dB*' which is the difference that BS4142 notes '*is likely to be an indication of adverse impact, depending on the context*'.

Additional context for the BS4142 initial assessment can be taken from the following:

- The adoption of suitable building envelope sound insulation performance specifications, as recommended in section 5.1 of this assessment, will allow the BS8233 recommended internal noise levels within dwellings to be achieved within the proposed new bungalow.
- The BS8233 recommended noise levels for external amenity areas are expected to be achieved in the garden and patio areas of the proposed new bungalow without the need for any additional mitigation measures.
- We understand that the SAS garage has been operating at the site for several years without any noise complaints from the existing surrounding noise sensitive receptors that would not benefit from the same degree of acoustic screening or distance attenuation compared to the location of the proposed new bungalow (i.e. the proposed new bungalow is expected to be subject to a lower impact from the SAS garage fixed plant noise than a number of nearby existing noise sensitive receptors).

Given the context, the noise levels from the SAS garage fixed plant are expected to have a low impact on the Project.

Based on the above, it is considered that noise should not be a determining factor in granting planning consent for the proposed development.

6.0 APPENDIX I: GLOSSARY OF TERMS

Background sound level, $L_{A90,T}$

The A-weighted sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given time interval

Equivalent continuous A-weighted sound pressure level, $L_{Aeq,T}$

The value of the A-weighted sound pressure level in decibels of continuous steady sound that, within a specified time interval, T , has the same mean-squared pressure as a sound that varies with time

Rating level, $L_{Ar,Tr}$

The rating level is the specific sound level plus any adjustment for the characteristic features of the sound

Reference time interval, T_r

The specified interval over which the specific sound level is determined. This is 1 hr during the day from 07:00 hrs to 23:00 hrs, and a shorter period of 15 min at night from 23:00 hrs to 07:00 hrs

Specific sound level, L_s

The equivalent continuous A-weighted sound pressure level produced by the specific sound source at the assessment location over a given reference time interval, T_r

BENCHMARK

ACOUSTICS