



THE SHIP INN,
LANGSTONE PO9

Plant Noise Assessment

Reference: 14322.RP01.PNA.1

Prepared: 6 June 2025

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Plant Noise Assessment



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0	First issue of report	1 May 2025	Toby Walton	David Johnston
1	Inclusion of EHO comments	6 June 2025	Toby Walton	David Johnston

Terms of contract:

RBA Acoustics Ltd have prepared this report in accordance with our Scope of Work 14322.SW01.0 dated 4 March 2025. RBA Acoustics Ltd shall not be responsible for any use of the report or its contents for any purpose other than that for which it was provided. Should the Client require the distribution of the report to other parties for information, the full report should be copied. No professional liability or warranty shall be extended to other parties by RBA Acoustics Ltd without written agreement from RBA Acoustics Ltd.

The recommendations within this report relate to acoustics performance only and will need to be integrated within the overall design by the lead designer to incorporate all other design disciplines such as fire, structural integrity, setting-out, etc. Similarly, any sketches appended to this report illustrate acoustic principles only and will need to be developed into full working drawings by the lead designer to incorporate all other design disciplines.



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Contents

1.	INTRODUCTION	1
2.	SITE DESCRIPTION	1
3.	ENVIRONMENTAL NOISE SURVEY	1
4.	PLANT NOISE CRITERIA	3
5.	PLANT NOISE ASSESSMENT	3
6.	CONCLUSION	5

APPENDIX A - ACOUSTIC TERMINOLOGY

APPENDIX B - INSTRUMENTATION

APPENDIX C - PLANT CALCULATIONS

APPENDIX D - CDM CONSIDERATIONS

APPENDIX E - GRAPHS AND SITE PLANS

1. INTRODUCTION

It is proposed to locate new items of plant at The Ship Inn, Langstone PO9. As part of the planning application, Havant Borough Council requires consideration be given to atmospheric noise emissions from the proposed equipment to the nearest noise-sensitive receptors.

RBA Acoustics have been commissioned to undertake measurements of the prevailing noise conditions at the site and to determine the atmospheric noise emission limits in accordance with Havant Borough Council's requirements. This report presents the results of the noise measurements, associated criteria and provides the required assessment.

2. SITE DESCRIPTION

The site is shown in relation to its surroundings in the site plan in Figure 1 (Appendix E).

The site is located to the east of Langstone Road, overlooking Emsworth Harbour to the south and east, with residential properties located to the north. The main sources of noise affecting the site was Langstone Road (A3202) which is a main thoroughfare serving Hayling Island. This was noted to consist of all types of traffic including heavy goods vehicles, generally free flowing at a speed limit of 40 mph.

3. ENVIRONMENTAL NOISE SURVEY

3.1 Survey Methodology

Monitoring of the prevailing background noise was undertaken over the following 74-hour period:

- 12:30 Friday 14 March to 14:45 Monday 17 March 2025.

As the survey was unattended it is not possible to comment with certainty regarding meteorological conditions throughout the entire survey period. However, based on observations during the site visits and weather reports for the area, conditions were generally considered suitable for obtaining representative noise measurements, being predominantly dry with little wind.

Measurements were made of the L_{A90} , L_{Amax} and L_{Aeq} noise levels over 15-minute sample periods. A summary of acoustic terminology is included in Appendix A.

3.2 Measurement Position

To determine the existing noise climate around the site measurements were undertaken at the following locations:

- ***Measurement Position 1 – Rear of Pub***

The microphone was positioned on a tripod at the rear of the pub within the vicinity of the proposed plant enclosure. The microphone was at a height of approximately 1.75 m and was generally screened from Langstone Road, therefore providing a representative scenario of the worst-case residential windows located behind the pub.

The measurement position is also illustrated on the site plan attached in Figure 1 and photo in Figure 2 (Appendix E).

3.3 Instrumentation

For information regarding the equipment used for the measurements please refer to Appendix B.

The sound level meter was calibrated both prior to and on completion of the survey with no significant calibration drift observed.

3.4 Survey Noise Levels

The noise levels measured are shown as time-histories on the attached Graphs 1-3 (Appendix E).

Selection of an appropriately representative background sound level is discussed in BS 4142:2014 *Methods for Rating and Assessing Industrial and Commercial Sound* as follows:

“In practice, there is no “single” background sound level as this is a fluctuating parameter. However, the background sound level used for the assessment should be representative of the period being assessed.

[...] A representative level should account for the range of background sound levels and should not automatically be assumed to be either the minimum or modal value.”

Graph 3 in Appendix E presents the range of background sound levels measured and, on this occasion, the ‘typical-lowest’ level has been chosen as representative for all periods. The ‘typical-lowest’ level can be determined statistically as the lowest $L_{A90, 15\text{mins}}$ level which is exceeded for 90% of the assessment period, or alternatively termed the 10th percentile of the measured $L_{A90, 15\text{mins}}$ levels.

The representative background L_{A90} and the period averaged L_{Aeq} noise levels measured are summarised in Table 1.

Table 1 – Measured Baseline Noise Levels

Measurement Period	Measurement Position 1 (MP1) – Rear of Pub	
	Representative Background Noise Level $L_{A90, 15\text{min}}$ (dB)	Period-Averaged Noise Level $L_{Aeq,T}$ (dB)
Daytime (07:00 – 23:00)	50	54
Night-time (23:00 – 07:00)	37	48

4. PLANT NOISE CRITERIA

The requirements of Havant Borough Council's Environmental Health Department regarding new building services plant are understood to be a rating level of noise emitted from building services plant to be controlled to at least 5 dBA below the lowest representative existing background sound level, when assessed in accordance with BS 4142:2014+A1:2019, at a position 1 metre outside any habitable window of any residential or other noise-sensitive property.

In line with the above requirements we would propose items of mechanical services be designed so that noise emissions from the plant do not exceed the following levels when assessed at the nearest noise sensitive location:

Table 2 – Plant Noise Limits at NSR

Assessment Period	Plant Noise Criteria to be achieved at 1m outside the window of the nearest Noise-Sensitive Receptor (NSR), $L_{A,r,T}$ [dB]
Daytime (07:00 – 23:00)	45
Night-time (23:00 – 07:00)	32

5. PLANT NOISE ASSESSMENT

This assessment has been based on the information provided to RBA by Heritage Potential and is described in the following sections.

5.1 Proposed Plant Items

The following plant is proposed for the scheme:

Table 3 – Proposed Plant Items

Ref.	Type/Duty	Plant Type
TF	Three Phase Single and Dual Ratio 200 kVA	Transformer

5.2 Plant Locations

The transformer is to be located within an enclosure at the rear of the pub. The equipment positions are indicated on the site plan in Figure 1 in Appendix E.

5.3 Plant Noise Levels

Information regarding the noise levels of the proposed plant has been provided by the manufacturer of the unit. The associated plant noise levels are detailed as follows:

Table 4 – Plant Noise Levels

Unit	Parameter	Sound Level (dB) at Octave Band Centre Frequency (Hz)								dBA
		63	125	250	500	1k	2k	4k	8k	
TF	L_w^*	69	61	58	57	54	50	44	25	59

**The octave band frequencies have been assumed from a similar unit.*

5.4 Noise-Sensitive Receptor (NSR)

Based on observations made on site and discussions with the design team we understand the nearest noise-sensitive receptors to the proposed plant to be as follows:

- ***NSR1 – Private Residence to the rear of The Ship***

The nearest noise sensitive receptor to the proposed plant are the private residences to the rear of the pub, located on a private access road. The nearest noise sensitive window is located approximately 17 metres from the weather louvres on the rear of the transformer enclosure.

The receptor is shown on the site plan in Figure 1 in Appendix E.

5.5 Predicted Noise Levels at NSR

Our calculation method for predicting plant noise egress from internal plantrooms to the nearest residential windows is summarised below:

- Source Term SWL
- Reverberant Conditions Correction & Transfer to Radiating Surface
- Composite Sound Reduction from External Wall/Louvres*
- Reverberant to Free-Field Correction
- Radiating Area Correction/Distance Attenuation/Directivity
- BS 4142 Ratings Penalties**

**In order to present a worst-case scenario, no reduction has been assumed from the radiating surface as weather louvres are proposed to be used for a small portion of the enclosure façade.*

***The proposed plant is not tonal, intermittent or impulsive in nature, therefore no numerical ratings penalties have been applied. The plant has not been identified as tonal as there is not a frequency band that is 3 dB higher than the adjacent bands on both sides.*

Calculation sheets are attached for further information in Appendix C.

The results of the calculations indicate the following noise levels at the nearest affected residential windows:

Table 5 – Predicted Plant Noise Levels

Operating Period	Noise Level (dB) at NSR1	
	Prediction	Criterion
Daytime (07:00 – 23:00)	28 $L_{Ar, Tr}$	45 $L_{Ar, Tr}$
Night-time (23:00 – 07:00)	28 $L_{Ar, Tr}$	32 $L_{Ar, Tr}$

Noise from the proposed plant installations is within the criteria required by Havant Borough Council and should therefore be considered acoustically acceptable.

6. CONCLUSION

RBA Acoustics have undertaken noise monitoring at The Ship Inn, Langstone PO9. The measured noise levels are presented within this report. The resultant noise levels have been used to determine the required criteria for atmospheric noise emissions from the proposed plant installations.

The results of the assessment indicate atmospheric noise emissions from the proposed plant are within the criteria required by Havant Borough Council. As such, the proposed plant installations should be considered acceptable in terms of noise.

Appendix A - Acoustic Terminology

A-weighting (e.g. dB(A))	A correction applied across the frequency bands to take into account the response of the human ear, and therefore considered to be more representative of the sound levels people hear.
DeciBel (dB)	Unit used for many different acoustic parameters. It is the logarithmic ratio of the level being assessed to a standard reference level.
L_{eq}	The level of a notional steady sound which, over a stated period of time, T , would have the same acoustic energy as the fluctuating noise measured over that period. Typically used to represent the average or ambient noise level.
$L_{Aeq,T}$	The A-weighted level of a notional steady sound which, over a stated period of time, T , would have the same acoustic energy as the fluctuating noise measured over that period. Typically used to represent the average or ambient noise level.
L_{An} (e.g. L_{A10} , L_{A90})	The sound level exceeded for n% of the time. E.g. L_{A10} is the A-weighted level exceeded for 10% of the time and as such can be used to represent a typical maximum level. Similarly, L_{A90} is the level exceeded for 90% of the measurement period, and is often used to describe the underlying background noise.
NR	Noise Rating – A single figure term to describe a measured noise level which considers the frequency content of the noise, generally used for internal noise level measurements (particularly mechanical services plant).

Appendix B - Instrumentation

The following equipment was used for the acoustic measurements.

Table B1 - Equipment Calibration Details

Manufacturer	Model Type	Serial No.	Calibration	
			Certificate No.	Valid Until
Norsonic Type 1 Sound Level Meter	Nor140	1403226	UCRT25/1108	16 January 2027
Norsonic Pre Amplifier	1209A	12066		16 January 2027
Norsonic ½" Microphone	1225	168180	UCRT25/1104	16 January 2027
Norsonic Sound Calibrator	1251	31988		16 January 2027

Appendix C - Plant Calculations

Table C1 - Example Calculation - Transformer

Parameter	Octave-band Noise Levels (dB) at Octave-band Centre Frequency [Hz]								dBA
	63	125	250	500	1000	2000	4000	8000	
Source Term L_w	69	61	58	57	54	50	44	25	59
Reverberant Conditions & Transfer to Radiating Element*	+2	+1	0	-1	-2	-2	-2	-2	-
Composite Sound Reduction Index	0	0	0	0	0	0	0	0	-
Reverberant to Free-field Correction	-6	-6	-6	-6	-6	-6	-6	-6	-
Radiating Area Correction/Distance Attenuation/Directivity	-24	-24	-24	-24	-24	-24	-24	-24	-
Noise level at receiver	41	32	28	26	22	18	12	0	28

**The correction here has been derived by combining the effects of distance loss, radiating reflections, plant room dimensions and finishes to calculate the reverberation time and subsequent reverberant level.*

***The radiating area has been calculated as 11.8 m².*

Appendix D - CDM Considerations

The Likelihood (**L**) the harm will occur can be assessed by applying an indicative score (from 1 to 5) as follows:

- 1 – Remote (almost never)
- 2 – Unlikely (occurs rarely)
- 3 – Possible (could occur, but uncommon)
- 4 – Likely (recurrent but not frequent)
- 5 – Very likely (occurs frequently)

The Severity of harm (**S**) can be assessed by applying an indicative score (from 1 to 5) as follows:

- 1 – Trivial (e.g. discomfort, slight bruising, self-help recovery)
- 2 – Minor (e.g. small cut, abrasion, basic first aid need)
- 3 – Moderate (e.g. strain, sprain, incapacitation for more than 3 days)
- 4 – Serious (e.g. fracture, hospitalisation for more than 24 hours, incapacitation for more than 4 weeks)
- 5 – Fatal (single or multiple)

The rating value is obtained by multiplying the two scores and is then used to determine the course of action.

Table D1- Risk Ratings

Rating Bands (Likelihood x Severity)		
Low Risk (1 – 8)	Medium Risk (9 -12)	High Risk (15 – 25)
May be ignored but ensure controls remain effective	Continue, but implement additional reasonable practicable controls where possible	Avoidance action is required; therefore alternative design solutions must be examined. Activity must not proceed until risks are reduced to a low or medium level

The following hazards pertinent to our design input have been identified and control measures suggested:

Table D2 – Risk Assessment

Hazard	Risk Of	At Risk	Rating			Control Measures	Controlled		
			L	S	R		L	S	R
Mineral wool within drywalls and linings	Skin and respiratory irritation	Contractors	4	3	12	Wear gloves and mask	1	3	3
Acoustic doors - weight	Strain of neck, limbs or back	Contractors	3	4	12	Provide sufficient manpower/ lifting gear	1	4	4
Plant room noise levels may be above lower exposure action level	Hearing damage.	Contractors/ Operators	3	4	12	Employer should undertake noise at work assessment.	1	4	4
Vibration Isolators	Injury to hands	Contractors	3	3	9	Care needs to be taken during adjustment. Follow manufacturers guidance	1	3	3

L: Likelihood S: Severity R: Rating

Appendix E - Graphs and Site Plans

The Ship Inn, Langstone PO9

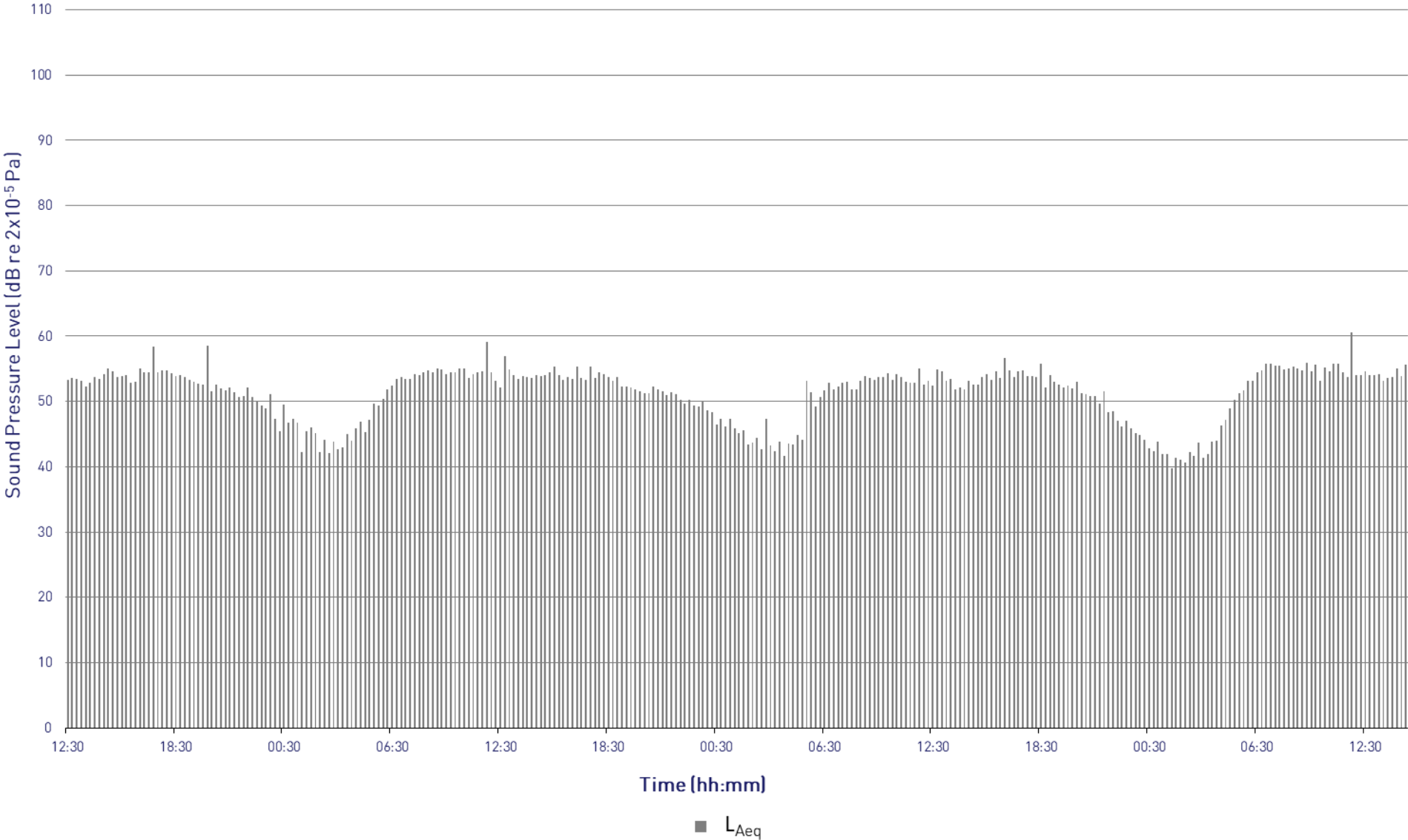
L_{Aeq} Time History

Measurement Position 1 - Rear of Pub - 14 March to 17 March 2025



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Graph 1



The Ship Inn, Langstone PO9

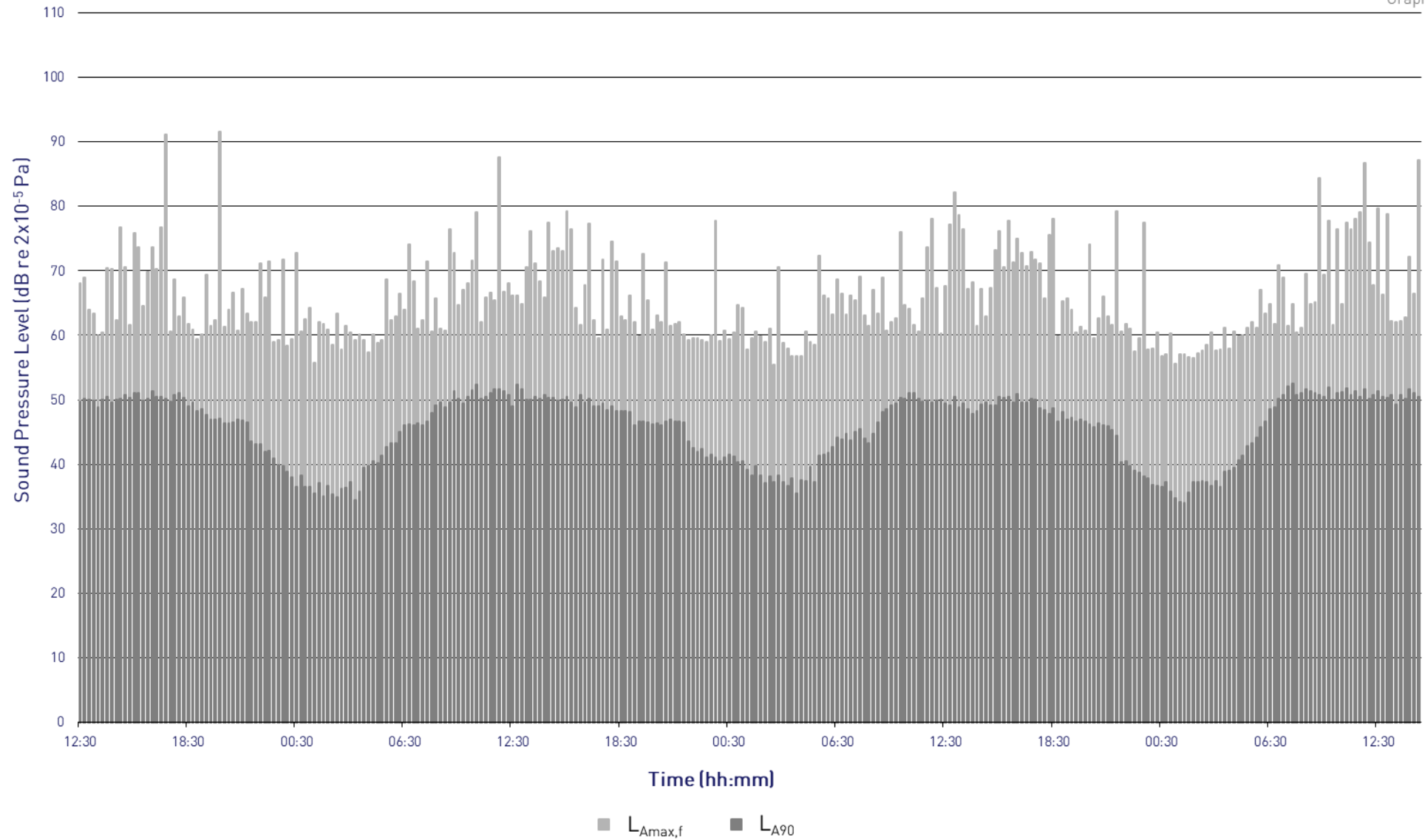
$L_{Amax,f}$ and L_{A90} Time History

Measurement Position 1 - Rear of Pub - 14 March to 17 March 2025



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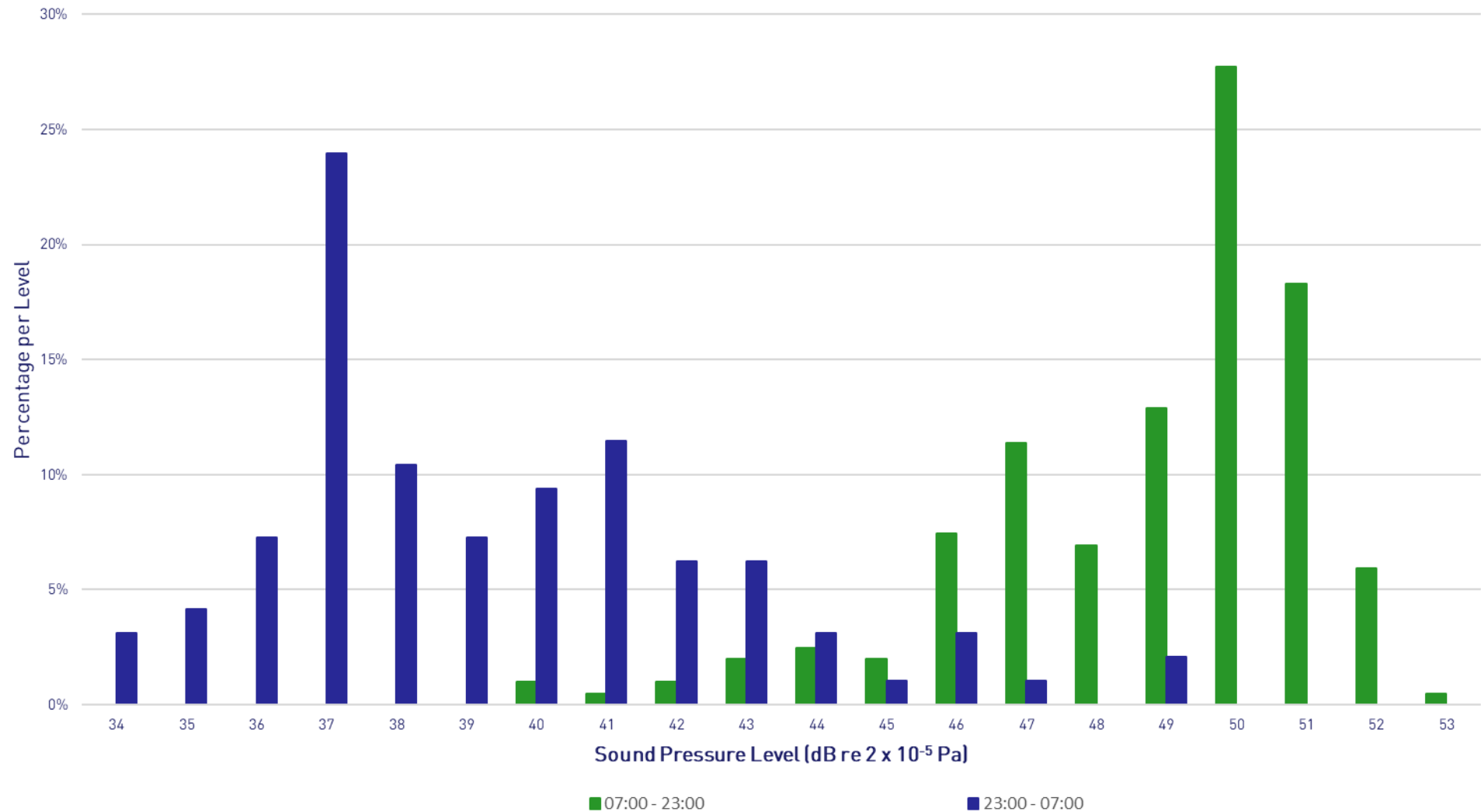
Graph 2



The Ship Inn, Langstone PO9

$L_{A90,15 \text{ minutes}}$ Histogram

Measurement Position 1 - Rear of Pub - 14 March to 17 March 2025



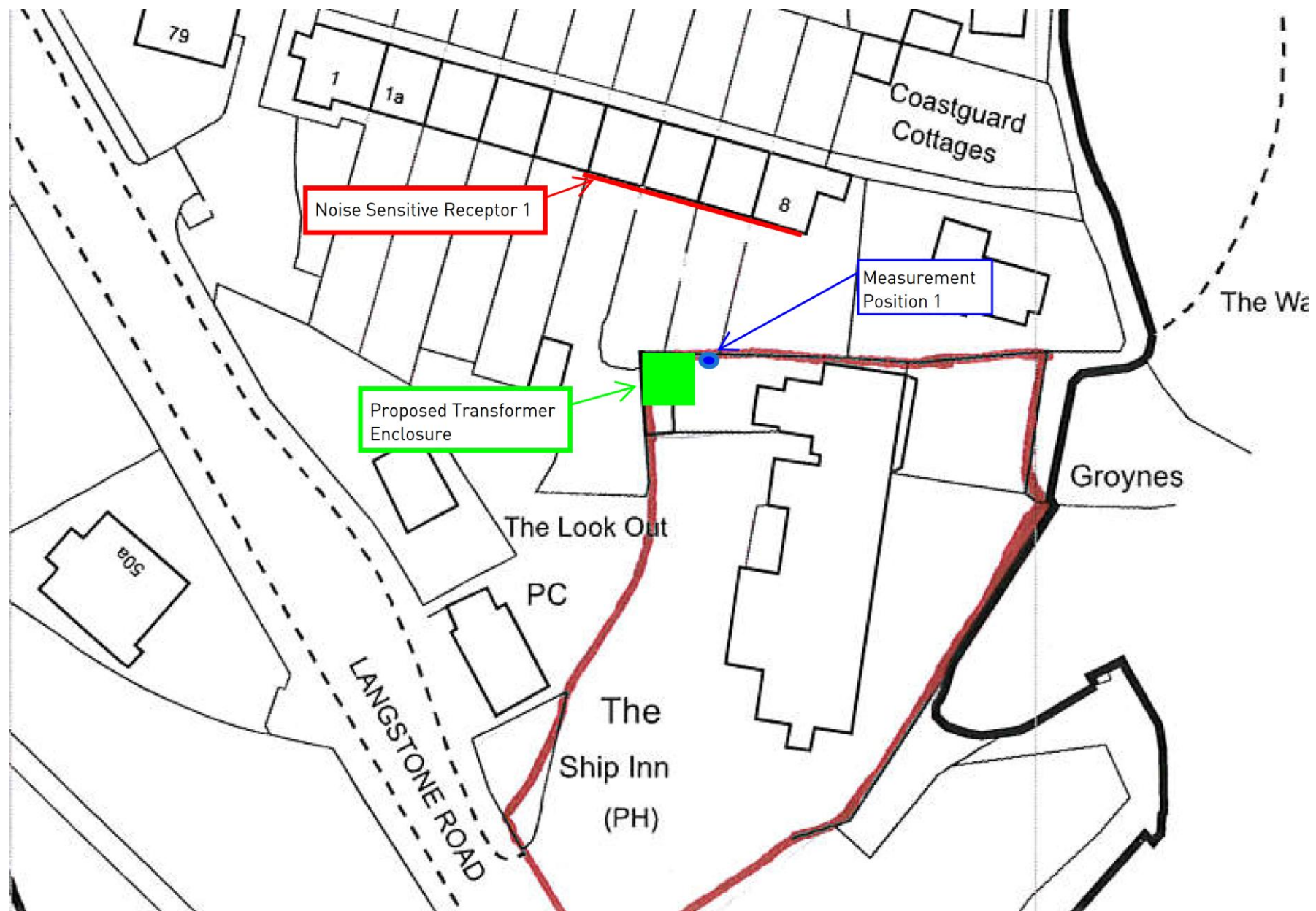


Figure 1 – Site Plan

The Ship Inn, Langstone P09

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Not to Scale



Figure 2 – Picture of Measurement Position 1

The Ship Inn, Langstone P09

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Not to Scale

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