



Project: J 06350
Noise Impact Assessment:
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Signed:

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Dated: Thursday 13th August 2026



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1. BACKGROUND

- 1.1. The application concerns the change of use of an existing building to a nursery.

See APPENDIX 2 - Site Location/Plans.

- 1.2. Sound Planning understands that the following activities will contribute to the noise emissions from the proposed new activity areas:

- Children's outside play in the northeastern external area at the site.

- 1.3. Sound Planning has been retained to evaluate potential noise impact on the nearest noise sensitive receivers using appropriate methodologies and assessment criteria, and to design a suitable noise mitigation strategy if required.

- 1.4. Jake Willmott is a Member of the Institute of Acoustics (M.I.O.A) having attained appropriate qualifications in acoustics and has seven years' experience undertaking acoustic assessments including significant experience of a wide variety of noise assessments in the context of planning applications.

Jake has attained the following qualifications within the field of acoustics:

- Institute of Acoustics (IOA) Diploma
- Master's Degree - Applied Acoustics (Solent University)

- 1.5. Site and Location

- 1.5.1. The site is in primarily residential area.

See APPENDIX 2 - Site Location/Plans.

- 1.5.2. The nearest noise sensitive receivers to the proposed activity area are residential dwellings to east and north.

See APPENDIX 2 - Site Location/Plans.

- 1.5.3. The area of the site to be used as outside play space for children is in the northern and northwestern areas of the site.

- 1.6. Proposed Operation Times:

- Monday – Friday: 08:00 – 18:00 hours



2. ASSESSMENT CRITERIA

2.1. There are no specific guidance or standards relating to noise from children's play. However, it is reasonable to infer criteria from general guidance and standards relating to community noise, such as the WHO Community Noise Guidelines. An assessment should also be made of the relative change in noise level based on the IEMA guidelines for noise impact assessment. The assessment should be made with reference to the requirements of Local and National Planning Policy.

2.2. National Planning Policy Framework

2.2.1. The National Planning Policy Framework (NPPF) was released in March 2012 and last updated in December 2023.

2.2.2. Paragraph 174 of the NPPF states: 'Planning policies and decisions should contribute to and enhance the natural and local environment by... preventing new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by, unacceptable levels of... noise pollution...'.

2.2.3. Paragraph 185 of the NPPF states that; '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:

- *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 (see Explanatory Note to the Noise Policy Statement for England (DEFRA)).*
- *identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason; and*
- *limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation.'*

2.2.4. Paragraph 193 of the NPPF states that; '*Planning policies and decisions should ensure that new development⁴ 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 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.’

- 2.2.5. Therefore, the NPPF requires that significant impacts are avoided, adverse impacts be mitigated and reduced to a minimum, and places an obligation on developers to not unduly constrain the operation of existing businesses and other noise sources in the area (the ‘agent of change’ principle).

2.3. Noise Policy Statement for England (NPSE)

- 2.3.1. The NPSE requires that developments:

- ‘Avoid significant adverse impacts on health and quality of life;
- Mitigate and minimise adverse impacts on health and quality of life; and
- Where possible contribute to the improvement of health and quality of life’

2.4. Local Planning Policy (Gravesham Borough Council)

- 2.4.1. Gravesham Borough Council’s Local Plan (Adopted 2014) does not set specific noise limits on nursery sites but requires that significant impacts are avoided and adverse impacts mitigated to a minimum in line with the requirements of National planning policy.

2.5. Noise Measurement Protocol - British Standard 7445-1: 2003¹

- 2.5.1. The methods and procedures described in BS 7445 are intended to be applicable to sounds from all sources, individually and in combination, which contribute to the total noise at a site.
- 2.5.2. The aim of the BS 7445 series is to provide authorities with material for the description of noise in community environments. Based on the principles

¹ Description and measurement of environmental noise. Part 1 – Guide to quantities and procedures.



described in this standard, acceptable limits of noise can be specified and compliance with these limits can be controlled.

2.5.3. BS 7445 does not specify limits for environmental noise.

2.6. BS4142: 2014+A1: 2019 – Methods for rating and assessing industrial and commercial sound

2.6.1. Noise from children’s play is fundamentally different to the types of noise intended to be assessed using the methodology from BS4142, which is intended to assess noise from mechanical plant and industrial processes.

2.6.2. Section 1.3 of BS4142 specifically states that the standard is:

... “*not intended to be applied to the rating and assessment of sound from:*

- a) ***Recreational activities, including all forms of motorsport;***
- b) *Music and other entertainment;*
- c) *Shooting grounds;*
- d) *Construction and demolition;*
- e) *Domestic animals;*
- f) ***People...”;***

2.7. Institute of Environmental Management & Assessment (IEMA) – Guidelines on Noise Impact Assessment.

2.7.1. This document gives guidance as to how basic noise changes may be categorised. The categorisation shown in the IEMA table below therefore takes this as its basis, with changes made as appropriate to reflect the site’s own circumstances, as defined in the guidelines. In light of the lack of specific noise levels within the NPSE document for LOAEL, NOEL and SOAEL, the classification process as defined within the IEMA guidelines:

Noise Change dB(A)	Effect(s)	NPSF Assessment
< 2.9	None/Not Significant	NOEL
3.0 - 4.9	Slight/Moderate	LOAEL
5.0 - 9.9	Substantial	SOAEL



≥ 10	Very Substantial	SOAEL
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2.8. World Health Organisation: Guidelines for Community Noise²

2.8.1. The W.H.O document covers a wide array of environmental noise issues and appropriate assessment criteria in relation to acceptable noise levels in various situations.

2.8.2. The Guidelines look at appropriate assessment methodology and statistical parameters which are most relevant when looking at particular noise sources; whether they cause annoyance and to what degree.

2.8.3. *The capacity of a noise to induce annoyance depends upon its physical characteristics, including the sound pressure level, spectral characteristics and variations of these properties with time. Noise with low-frequency components require lower guideline values. For intermittent noise, it is emphasized that it is necessary to take into account both the maximum sound pressure level and the number of noise events.*

2.8.4. W.H.O – Amenity Criteria³

Specific Environment	Critical Health Effects	L _{Aeq} (dB)	Time Base (hours)	L _{AF} max (dB)
Outdoor Living Area	Serious annoyance, daytime evening	55	16	
	Moderate annoyance, daytime evening	50	16	
Dwelling, Indoors	Speech intelligibility and moderate annoyance, daytime and evening	35	16	

3. NOISE SURVEY METHODOLOGY

3.1. Sound Planning attended the site on Wednesday 22nd to Thursday 23rd July 2026 to undertake a noise survey.

² World Health Organisation Recommended Levels for Community Noise 2000.

³ World Health Organisation Recommended Levels for Community Noise 2000.



- 3.1.1. The sound measurements were undertaken in accordance with BS 7445⁴ and BS 4142.⁵

3.2. Noise Measurements

- 3.2.1. Sound monitoring equipment was installed adjacent to the site boundary shared with the nearest noise sensitive receiver. The position is also representative of noise levels experienced at the rear façade of other NSR's nearby.

See APPENDIX 2 – Site Location & APPENDIX 3 – Site Photographs.

- 3.2.2. The environmental noise measurements were carried out over a 24-hour period.
- 3.2.3. The sound level meter was Class 1 – details provided in 3.3. The microphone was positioned 1.5m above ground level and at least 3.5m from any vertical reflective façade.

3.3. Sound Level Measurement Equipment

Equipment	Make	Model	Class	Serial Number	UKAS Calibration
SLM	Svantek	971A	1	173077	1516641-1 (12/03/26)
Field Calibrator	Norsonic	NOR1255	1	125525638	U55078 (05/06/26)

- 3.4. The Sound Level Meter (SLM) was field calibrated before and after the on-site noise measurements. No deviation was detected (1kHz). UKAS accredited calibration certificates are available on request.

⁴ British Standard 7445-1: 2003 – *Description and measurement of environmental noise.*

⁵ British Standard 4142: 2014+A1: 2019 – *Method for rating industrial noise affecting mixed residential and industrial areas.*



- 3.5. The noise measurements were undertaken in accordance with BS 7445.
- 3.6. See APPENDIX 4 – Noise Measurement Data.
- 3.7. Noise at the measurement location was dominated by road traffic noise from the surrounding road network and nature noise (birds in trees, wind rustling leaves).

4. NOISE LEVEL CALCULATION METHODOLOGY

- 4.1. A noise model using SoundPLAN Essentials 6.0 has been created to predict sound propagation between the outside play space and the nearby NSR's. SoundPLAN Essentials implements ISO 9613-2, CRTN, and CRN for noise propagation calculations. ISO 9613-2 accounts for meteorological conditions for noise propagation by calculating noise levels with the receiver always 'downwind' from the noise source to give a worst-case result.
- 4.2. Topography data for the model was imported from Google Maps.
- 4.3. Ground effects have been modelled based on a site inspection and available satellite imagery available for the site.
- 4.4. A 2m boundary fence around the gardens of the NSR's has been included in the model based on site inspection.
- 4.5. No screening effect has been assumed as a worst-case for foliage as hedges and bushes on the propagation path between the water play area and the receiver are not solely evergreen plants, so any noise attenuation provided will not be effective in winter months.
- 4.6. The reflection order for the model has been set to 4.
- 4.7. The outside play area has been modelled as an area sound source at a height of 0.5m above ground level to represent children playing.
- 4.8. The sound power level for children playing has been based on measurements taken at another similar nursery site by Sound Planning and scaled to account for the number of children present using the formula:

$$L_2 = L_1 + 10*\log(n)$$

Where 'n' is the result of the new capacity divided by the old capacity



- 4.9. The sound power of the area source has therefore been set to 94.4 dB L_{wA} .⁶
- 4.10. Receiver points were added at the building façade of each NSR (representing daytime use of habitable rooms) at 1.5m elevation.

5. NOISE MEASUREMENT RESULTS

5.1. Measured Noise Levels

Location	Period (hours)	dB $L_{Aeq,T}$
MP1 – adjacent to NSR1 boundary	08:00-18:00	50

See APPENDIX 4 – Noise Measurement Data

6. NOISE CALCULATION RESULTS

6.1. Noise Model Output:

Location	Area	L_{Aeq}
NSR1 – adjacent residential property to the East	<i>Ground Floor, children's play noise level incident on habitable room windows</i>	54
NSR2 – adjacent residential property to the Northwest	<i>Ground Floor, children's play noise level incident on habitable room windows</i>	44
NSR3 – adjacent residential property to the North	<i>Ground Floor, children's play noise level incident on habitable room windows</i>	43

⁶ Sound power level of 20 children playing measured at previous site by Sound Planning (area source) = 90 dB L_{wA} . Sound power of 55 children playing is therefore $90 + 10 \log (55/20) = 94.4$ dB L_{wA} .



7. NOISE IMPACT ASSESSMENT

- 7.1. The noise level predicted from the children's play area is below the upper guideline value from the WHO Community Noise Guidelines.
- 7.2. The predicted noise level is 4 dB above the existing ambient noise level at the worst case NSR (NSR1). Noise emissions from the site at NSR2 and NSR3 are significantly below the existing ambient noise level and are not likely to give rise to adverse impacts.
- 7.3. Comparison of the predicted noise level for the nursery outside area at NSR with reference to the IEMA Guidelines for Noise Assessment shows that an increase in ambient noise levels at the receiver of 5.4 dB is likely, which would normally be classified as 'Substantial', SOAEL.
- 7.4. A noise mitigation strategy should be implemented for the site to bring the level of impact at NSR1 down to LOAEL at most.

8. NOISE MITIGATION STRATEGY

- 8.1. A reduction of the number of children using the outside space at any given time is the appropriate noise mitigation strategy as it is not likely to be feasible to implement high (approximately 3m) noise barriers directly adjacent to the neighbouring residential property to screen residents from noise.
- 8.2. A reduction of the number of children outside at any given time to 27 would reduce noise emissions by 3 dB, which would result in a change in noise levels of 3.5 dB, which would be classed as Slight/Moderate, LOAEL, which is an acceptable level of impact.
- 8.3. The use of the site as a nursery falls within daytime hours on weekdays only, which is the time least likely to disturb residential amenity, so a slight increase in noise levels should be acceptable given the nature of the nursery as a community facility providing services to local residents.

9. CONCLUSIONS

- 9.1. Sound Planning has carried out an environmental noise impact assessment in accordance with relevant standards and guidance.
- 9.2. The noise levels predicted from the use of the outside areas, which is the main noise source proposed at the site are significantly predicted to be within guideline ranges from



the WHO Community Noise Guidelines, but may result in a change in the ambient noise level at the worst affected NSR which is consistent with adverse impacts.

- 9.3. Noise emissions from the site at other NSRs in the surrounding area are predicted to be significantly below the existing ambient noise level and are indicative of low or no adverse impact.
- 9.4. A restriction of the number of children using the outside space to 27 is recommended to reduce noise emissions from the site, and to limit the change in noise level experienced by residents of the NSR to '**slight/moderate**' when assessed against the requirements of the IEMA Guidelines on Noise Impact Assessment. This is consistent with LOAEL and should be seen as an acceptable level of impact.
- 9.5. Subject to a limit on the capacity of the outside area for children, noise emissions from the site will be compliant with the requirements of local and national planning policy and significant adverse impacts will be avoided.



APPENDIX 1

Glossary of Acoustic Terms

The Decibel, dB

The unit used to describe the magnitude of sound is the decibel (dB) and the quantity measured is the sound pressure level. The decibel scale is logarithmic and it ascribes equal values to proportional changes in sound pressure, which is a characteristic of the ear. Use of a logarithmic scale has the added advantage that it compresses the very wide range of sound pressures to which the ear may typically be exposed to a more manageable range of numbers. The threshold of hearing occurs at approximately 0 dB (which corresponds to a reference sound pressure of 2×10^{-5} pascals) and the threshold of pain is around 120 dB. The sound energy radiated by a source can also be expressed in decibels. The sound power is a measure of the total sound energy radiated by a source per second, in watts. The sound power level, L_w is expressed in decibels, referenced to 10^{-12} watts.

Frequency, Hz

Frequency is analogous to musical pitch. It depends upon the rate of vibration of the air molecules that transmit the sound and is measure as the number of cycles per second or Hertz (Hz). The human ear is sensitive to sound in the range 20 Hz to 20,000 Hz (20 kHz). For acoustic engineering purposes, the frequency range is normally divided up into discrete bands. The most commonly used bands are octave bands, in which the upper limiting frequency for any band is twice the lower limiting frequency, and one-third octave bands, in which each octave band is divided into three. The bands are described by their centre frequency value and the ranges which are typically used for building acoustics purposes are 63 Hz to 4 kHz (octave bands) and 100 Hz to 3150 Hz (one-third octave bands).

Noise Rating

The Noise Rating (NR) system is a set of octave band sound pressure level curves used for specifying limiting values for building services noise. The Noise Criteria (NC) and Preferred Noise Criteria (PNC) systems are similar.

A-weighting

The sensitivity of the ear is frequency dependent. Sound level meters are fitted with a weighting network which approximates to this response and allows sound levels to be expressed as an overall single figure value, in dB(A).

Noise Descriptors

Where noise levels vary with time, it is necessary to express the results of a measurement over a period of time in statistical terms. Some commonly used descriptors follow.

$L_{Aeq, T}$ *The most widely applicable unit is the equivalent continuous A-weighted sound pressure level ($L_{Aeq, T}$). It is an energy average and is defined as the level of a notional sound which (over a defined period of time, T) would deliver the same A-weighted sound energy as the actual fluctuating sound.*



- L_{AE}** *Where the overall noise level over a given period is made up of individual noise events, the $L_{Aeq, T}$ can be predicted by measuring the noise of the individual noise events using the sound exposure level, L_{AE} (or SEL or L_{AX}). It is defined as the level that, if maintained constant for a period of one second, would deliver the same A-weighted sound energy as the actual noise event.*
- L_{A1}** *The level exceeded for 1% of the time is sometimes used to represent typical noise maxima.*
- L_{A10}** *The level exceeded for 10% of the time is often used to describe road traffic noise.*
- L_{A90}** *The level exceeded for 90% of the time is normally used to describe background noise.*

Sound Transmission Descriptors

- D_{nT}** Standardised level difference
- D_{nT, w}** Weighted standardised level difference
- L₁** The average sound pressure level in the source room
- L₂** The average sound pressure level in the receiving room
- T** Reverberation time (receiving room)
- T₀** Reference reverberation time = 0.5s
- C_{tr}** Adaption spectrum which takes account for low to medium speed road/rail/air traffic; disco music; and factory noise (medium to low frequency noise).
- C** Adaption spectrum which takes account of domestic activities including speech, music, radio and television.

Frequency Analysis

- Octave Band** *A band of frequencies the upper limit of which is twice the lower limit. They are known by their centre frequency, e.g., 63, 125, 250, 500, 1000, 2000 Hz...*
- One Third Octave** *The logarithmic frequency interval between a lower frequency f_2 , when f_2/f_1 equals $2^{1/3}$ apart. Frequencies include: 100, 125, 160, 200, 250, 315, 400, 500, 630, 800, 1000Hz.*

Sound Transmission in the Open Air

Most sources of sound can be characterised as a single point in space. The sound energy radiated is proportional to the surface area of a sphere centred on the point. The area of a sphere is proportional to the square of the radius, so the sound energy is inversely proportional to the square of the radius. This is the inverse square law.

In decibel terms, every time the distance from a point source is doubled, the sound pressure level is reduced by 6 dB. Road traffic noise is a notable exception to this rule, as it approximates to a line source, which is represented by the line of the road. The sound energy radiated is



inversely proportional to the area of a cylinder centred on the line. In decibel terms, every time the distance from a line source is doubled, the sound pressure level is reduced by 3 dB.

Factors Affecting Sound Transmission in the Open Air

Reflection

When sound waves encounter a hard surface, such as concrete, brickwork, glass, timber or plasterboard, it is reflected from it. As a result, the sound pressure level measured immediately in front of a building façade is approximately 3 dB higher than it would be in the absence of the façade.

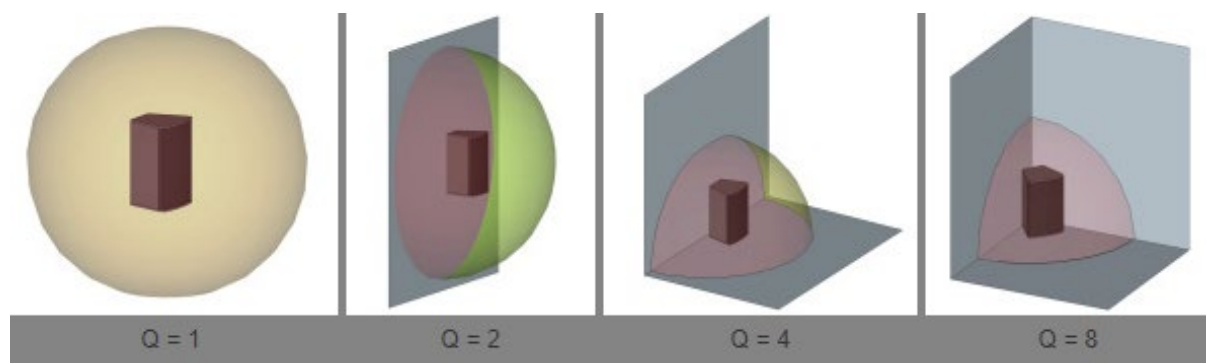
Screening and Diffraction

If a solid screen is introduced between a source and receiver, interrupting the sound path, a reduction in sound level is experienced. This reduction is limited, however, by diffraction of the sound energy at the edges of the screen. Screens can provide valuable noise attenuation however. For example, a timber boarded fence built next to a motorway can reduce noise levels on the land beyond, typically by around 10 dB(A). The best results are obtained when a screen is situated close to the source or close to the receiver.

Meteorological Effects

Temperature and wind gradients affect noise transmission, especially over large distances. The wind effects range from increasing the level by typically 2 dB downwind, to reducing it by typically 10 dB upwind – or even more in extreme conditions. Temperature and wind gradient are variable and difficult to predict.

Directivity Index



APPENDIX 2
Site Location/Plans
Google Earth



Key:

-  NSR 1 – Residential Property
-  NSR 2 – Residential Property
-  NSR 3 – Residential Property
-  Site Boundary (approx.)
-  Noise Monitoring Position (MP1)
-  Outside Play/Learning Area (approx.)

APPENDIX 3
Site Photographs

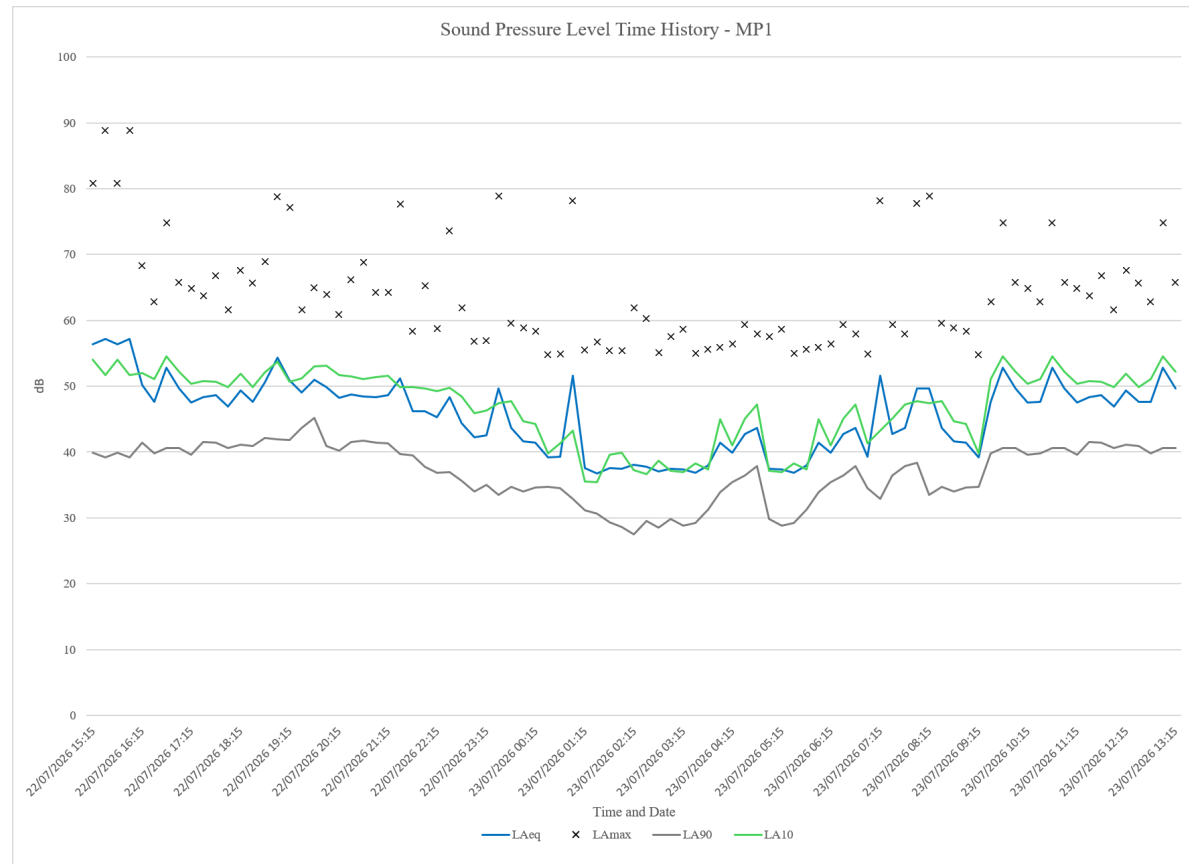


Noise Measurement Position



APPENDIX 4

Noise Measurement Data



APPENDIX 5

Noise Map

