



B8 Open Storage Yard, Anglian Business Park, Royston
Noise Assessment for s73 Planning Application

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1. INTRODUCTION

1.1. Overview

inacoustic has been commissioned to assess the potential noise impact associated with the proposed operations from a B8 Open Storage Yard, Anglian Business Park, Orchard Road, Royston, Hertfordshire. The Site lies at the southern end of Anglian Business Park, adjacent to existing industrial premises to the west, the railway line to the south, and residential properties along Braeburn Walk to the east.

This technical noise assessment has been prepared to support a Section 73 planning application seeking to vary Condition 4 of the current permission in order to amend the approved hours of operation to 07:00–21:00 Monday to Friday, 09:00–16:00 Saturday, and closed on Sundays and Bank Holidays. No other changes to the consented development are proposed.

The assessment considers the likely effect of noise generated by on-site activities; specifically car and LGV movements, forklift truck loading/unloading of pallets, and operation of the electrically powered security gates, with reference to the nearest residential receptors.

This noise assessment is necessarily technical in nature; therefore a glossary of terms is included in Appendix A to assist the reader.

1.2. Scope and Objectives

The scope of the noise assessment can be summarised as follows:

- A sound monitoring survey was undertaken at a discrete location representative of the closest noise-sensitive receptors to the Site;
- An assessment of potential noise impacts with respect to the prevailing acoustic conditions at existing off-site receptors; and
- Recommendation of mitigation measures, where necessary, to comply with the requirements of the National Planning Practice Guidance in England: Noise¹ and BS4142².

¹ Department for Communities and Local Government (DCLG), 2014. National Planning Practice Guidance for England: Noise. DCLG.

² British Standard Institution. BS 4142:2014+A1:2019: Methods for rating and assessing industrial and commercial sound.

2. LEGISLATION AND POLICY FRAMEWORK

The development proposals for the Site are guided by the following policy directives and guidance:

2.1. National Policy

2.1.1. National Planning Policy Framework, 2024

The *National Planning Policy Framework* (NPPF)³ sets out the UK Government's planning policies for England. Planning policy requires that applications for planning permission must be determined in accordance with the development plan, unless material considerations indicate otherwise.

The NPPF is also a material consideration in planning decisions. It sets out the Government's requirements for the planning system and how these are expected to be addressed.

Under Section 15; *Conserving and Enhancing the Natural Environment*, in Paragraph 187, the following is stated:

"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."*

Paragraph 198 of the document goes on to state:

"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"*

Paragraph 198 refers to the Noise Policy Statement for England, which is considered overleaf.

³ Ministry of Housing, Communities & Local Government (MHCLG), December 2024. National Planning Policy Framework. HMSO. London.

2.1.2. Noise Policy Statement for England, 2010

The underlying principles and aims of existing noise policy documents, legislation and guidance are clarified in *DEFRA: 2010: Noise Policy Statement for England* (NPSE)⁴. The NPSE sets out the “*Long Term Vision*” of Government noise policy as follows:

“Promote good health and good quality of life through the effective management of noise within the context of Government policy on sustainable development”.

The NPSE outlines three aims for the effective management and control of environmental, neighbour and neighbourhood noise:

- *“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”.*

The guidance states that it is not possible to have a single objective noise-based measure that defines “*Significant Observed Adverse Effect Level (SOAEL)*” that is applicable to all sources of noise in all situations and that not having specific SOAEL values in the NPSE provides the necessary policy flexibility until further evidence and suitable guidance is available.

2.1.3. National Planning Practice Guidance in England: Noise, 2019

Further guidance in relation to the NPPF and the NPSE has been published in the *National Planning Practice Guidance in England: Noise* (PPG:N)⁵, which summarises the noise exposure hierarchy, based on the likely average response. The following three observed effect levels are identified below:

- **Significant Observed Adverse Effect Level:** This is the level of noise exposure above which significant adverse effects on health and quality of life occur;
- **Lowest Observed Adverse Effect Level:** This is the level of noise exposure above which adverse effects on health and quality of life can be detected; and
- **No Observed Adverse Effect Level:** This is the level of noise exposure below which no effect at all on health or quality of life can be detected.

⁴ Department for Environment, Food and Rural Affairs (DEFRA), 2010. Noise Policy Statement for England. DEFRA.

⁵ Department for Communities and Local Government (DCLG), 2019. National Planning Practice Guidance for England: Noise. DCLG.

Criteria related to each of these levels are reproduced in Table 1.

TABLE 1: SIGNIFICANCE CRITERIA FROM PPG:N

Perception	Examples of Outcomes	Increasing Effect Level	Action
No Observed Effect Level			
Not Noticeable	No Effect	No Observed Effect	No specific measures required
No Observed Adverse Effect Level			
Noticeable and Not Intrusive	Noise can be heard, but does not cause any change in behaviour, attitude or other physiological response. Can slightly affect the acoustic character of the area but not such that there is a change in the quality of life.	No Observed Adverse Effect	No specific measures required
Lowest Observed Adverse Effect Level			
Noticeable and Intrusive	Noise can be heard and causes small changes in behaviour, attitude or other physiological response, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a small actual or perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level			
Present and Disruptive	The noise causes a material change in behaviour, attitude or other physiological response, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid
Present and Very Disruptive	Extensive and regular changes in behaviour, attitude or other physiological response and/or an inability to mitigate effect of noise leading to psychological stress, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory.	Unacceptable Adverse Effect	Prevent

2.2. Local Policy

2.2.1. North Hertfordshire Local Plan 2011-2031

Policy D3 of the North Hertfordshire Local Plan 2011-2031 states the following:

“Planning permission will be granted for development proposals which do not cause unacceptable harm to living conditions

Where the living conditions of proposed developments would be affected by an existing use or the living conditions of an existing development would be affected by a proposed use, the Council will consider whether there are mitigation measures that can be taken to mitigate the harm to an acceptable level. If the Council is not satisfied that mitigation proposals would address the identified harm, development proposals will not be permitted.”

2.3. British Standards

2.3.1. BS 4142:2014+A1:2019

BS 4142:2014+A1:2019 sets out a method to assess the likely effect of sound from factories, industrial premises or fixed installations and sources of an industrial nature in commercial premises, on people who might be inside or outside a dwelling or premises used for residential purposes in the vicinity.

The procedure contained in BS 4142:2014+A1:2019 for assessing the effect of sound on residential receptors is to compare the measured or predicted sound level from the source in question, the $L_{Aeq,T}$ *specific sound level*, immediately outside the dwelling with the $L_{A90,T}$ background sound level.

Where the sound contains a tonality, impulsivity, intermittency and other sound characteristics, then a correction depending on the grade of the aforementioned characteristics of the sound is added to the specific sound level to obtain the $L_{Ar,Tr}$ *rating level*.

BS 4142:2014+A1:2019 states: *“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”*. An estimation of the impact of the specific sound can be obtained by the difference of the rating level and the background sound level and considering the following:

- *“Typically, the greater this difference, the greater the magnitude of the impact.”*
- *“A difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context.”*
- *“A difference of around +5dB is likely to be an indication of an adverse impact, depending on the context.”*
- *“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.”*

During the daytime, the assessment is typically carried out over a reference time period of 1-hour, with a reference period of 15-minutes used for the night-time assessment. The periods associated with daytime or night-time, for the purposes of the assessment, are considered to be daytime 07:00 to 23:00 and night-time 23:00 to 07:00.

2.4. Other Guidance

2.4.1. Relative Change in Ambient Noise Level

In circumstances where a noise environment may be altered by addition or removal of a noise source, considered to be largely anonymous or within the prevailing acoustic character of an area, for example, changes to traffic quantum or patterns, it is normal to consider the relative change in ambient noise level. The assessment, therefore, focuses primarily on this phenomenon.

The impact scale adopted in this assessment is shown in Table 2 below, which relates to established human responses to noise.

TABLE 2: IMPACT SCALE FOR COMPARISON OF FUTURE NOISE AGAINST EXISTING NOISE

Noise Level Change dB(A)	Subjective Response	Significance
0	No change	No impact
0.1 – 0.9	Imperceptible change	Negligible impact
1.0 – 2.9	Barely perceptible	Minor impact
3.0 – 5.9	Noticeable	Moderate impact
6.0 – 9.9	Up to a doubling or halving of loudness	Substantial impact
10.0 or more	More than a doubling or halving of loudness	Major impact

The criteria above reflect the key benchmarks that relate to human perception of sound. A change of 3 dB(A) is generally considered to be the smallest change in environmental noise that is perceptible to the human ear. A 10 dB(A) change in noise represents a doubling or halving of the noise level. The difference between the minimum perceptible change and the doubling or halving of the noise level is split to provide greater definition to the assessment of changes in noise level.

It is considered that the criteria specified in Table 2 provide a good indication as to the likely significance of changes in noise levels in this case and have been used to assess the impact of noise from the proposed development.

3. SITE DESCRIPTION

3.1. Site and Surrounding Area

The Site is located at the southern end of Anglian Business Park, Orchard Road, Royston, Hertfordshire (SG8 5TW). To the west the Site adjoins other industrial and commercial premises within the Business Park, while the Cambridge-King's Cross railway line forms the southern boundary.

The closest Noise Sensitive Receptors (NSRs) are the residential dwellings on Braeburn Walk and Barnack Grove, situated immediately to the east of the Site across a shared parking court. These receptors are referred to as R1-R5 in this assessment.

The existing sound environment at the Site is influenced by local road traffic on Orchard Road and the wider highway network, as well as railway movements and general activity from the Business Park.

The location of the Site, receptors and surrounding area is shown in Figure 1.

FIGURE 1: THE SITE, NSRs AND SURROUNDING AREA



3.2. Proposed Development Overview

Planning permission was originally granted under application 23/00244/FP (April 2023) for the temporary change of use of vacant industrial land to a B8 open storage yard for a period of five years. The consent included the formation of a hardstanding, new vehicular access, on-site parking with EV charging, internal security fencing and associated boundary treatments.

A subsequent Section 73 approval 25/00391/S73 (March 2025) permitted a minor adjustment to finished site levels through the substitution of approved layout and section drawings. This amendment did not alter the form or temporary nature of the development.

In September 2025, a further Section 73 application (25/02452/S73) was submitted seeking to vary Condition 4 of permission 23/00244/FP to enable unrestricted 24-hour operation. That application was supported by a detailed noise assessment demonstrating that, even under robust worst-case assumptions, the predicted BS 4142 rating levels would remain at or below the prevailing background sound levels during both daytime and night-time hours. On this basis, the assessment concluded that the operation would result in a *Low Impact* under BS 4142 and a *No Observed Adverse Effect Level (NOAEL)* in PPG:N terms.

The Council nevertheless refused the application. For completeness and accuracy, the Reason for Refusal is reproduced below:

“Condition 4 is imposed on planning permission 23/00244/FP to protect the residential amenities of the adjoining neighbours. This application does not demonstrate that there would be no adverse harm from night time operational activities on these neighbours, so to ensure the protection of nearby residential amenity, this application is refused in accordance with the aims of Local Plan Policy D3.”

The refusal did not dispute the nature of the B8 use or daytime operations. While Environmental Health did raise a series of technical queries during the determination period, these were already in the process of being addressed and are now fully incorporated and clarified within this updated assessment. The decision itself arose from a concern regarding the principle of night-time activity in proximity to existing dwellings, notwithstanding the evidence that the predicted rating levels during the night-time period would remain at or below the prevailing background sound levels.

In order to respond constructively to the Council's stated position, and without prejudice to the earlier technical case, the Applicant has elected to pursue a revised and more limited proposal. This updated application does not seek 24-hour use and makes no changes to the approved development, physical works, or permitted land use. Instead, it seeks only to vary Condition 4 so as to allow extended but defined hours of operation of:

- 07:00–21:00 Monday to Friday; and
- 09:00–16:00 on Saturdays; and
- Closed on Sundays and Bank Holidays.

4. MEASUREMENT METHODOLOGY

4.1. General

The prevailing noise conditions in the area have been determined by an environmental noise survey conducted between Thursday 28th August 2025 and Tuesday 2nd September 2025.

4.2. Measurement Details

All noise measurements were undertaken by a consultant certified as competent in environmental noise monitoring, and, in accordance with the principles of British Standard 7445:2003 '*Description and measurement of environmental noise*'⁶.

All noise measurement equipment used during the survey conformed to Type 1 specification of British Standard 61672:2013 '*Electroacoustics. Sound level meters. Part 1 Specifications*'⁷. A full inventory of this equipment is shown in Table 3 below.

TABLE 3: INVENTORY OF SOUND MEASUREMENT EQUIPMENT

Position	Make, Model & Description	Serial Number	Calibration Certificate Number	Calibration Due Date
MPI	Rion NL-52 Sound Level Meter	00876018	1177009	27/02/2027
	Rion NH-25 Preamplifier	76135		
	Rion UC-59 Microphone	11538		
	Rion NC-74 Acoustic Calibrator	34904966	1178397	20/03/2026

The sound measurement equipment used during the survey was field calibrated at the start and end of the measurement period. A calibration laboratory has calibrated the field calibrator used within the twelve months preceding the measurements. A drift of less than 0.2 dB in the field calibration was found to have occurred on the sound level meter.

The weather conditions were monitored via the deployment of a tipping rain gauge and anemometer and were found to be conducive with environmental noise measurement; comprising no precipitation and low wind speeds, below 5ms⁻¹.

The microphone was fitted with a protective windshield for the measurement, which is described in Table 4, with an aerial photograph indicating its location shown in Figure 2.

⁶ British Standards Institute, British Standard 7445: 2003: *Description and measurement of environmental noise*, 2003.

⁷ British Standards Institute, British Standard 61672: 2013: *Electroacoustics. Sound level meters. Part 1 Specifications*, 2013.

TABLE 4: MEASUREMENT POSITION DESCRIPTION

Measurement Position	Description
MP1	An unattended daytime and night-time measurement of sound was undertaken under free-field conditions at a height of 1.5 metres above local ground level. The microphone was positioned close to the eastern boundary of the Site, representative of the nearest residential properties on Braeburn Walk. The prevailing sound environment at this location was characterised by road traffic on Orchard Road and the wider local highway network, together with railway movements on the adjacent Cambridge-King's Cross line to the south. Occasional activity from within Anglian Business Park was also audible.

FIGURE 2: MEASUREMENT POSITION



4.3. Sound Indices

The parameters reported are the average Equivalent Continuous Sound Level, $L_{Aeq,T}$, the statistical index (typical) Background Sound Level, $L_{A90,T}$, as well as the and the typical Maximum Sound Pressure Level, L_{AFmax} . An explanation of the sound units presented is given in Appendix A.

The measured L_{Aeq} , L_{AFmax} , and L_{AF90} sound levels are presented as time histories in a graph in Appendix B. Furthermore, the statistical distribution of the measured background sound levels to derive the typical representative $L_{A90,T}$ values are presented in a graphical format in Appendix C.

4.4. Summary Results

The summarised results of the environmental sound measurements, during the daytime period, can be seen below in Table 5. Values have been rounded to the nearest whole number.

TABLE 5: SUMMARY OF SOUND MEASUREMENT RESULTS

Measurement Position	Period	L _{Aeq,T} (dB)	L _{AF90,T} (dB)	L _{AFmax} (dB)
MP1	Day (07:00-21:00)	51	44	72

Baseline sound levels were measured at MP1 over a continuous 5-day period, inclusive of a weekend, and have been analysed to derive representative values for the daytime periods relevant to the proposed operating hours.

5. OPERATIONAL NOISE ASSESSMENT

5.1. Noise Predictions

5.1.1. General

To determine the potential noise effects associated with the operation of the Site during the daytime period, a prediction exercise has been undertaken based on a probable worst-case operating scenario. The assessment considers the combined effect of car and LGV movements, forklift operations, and electrically operated gate movements within the yard.

Two complementary assessment approaches have been adopted:

- BS 4142:2014+A1:2019 – applied to the on-site operational sources (car and LGV manoeuvres within the yard, forklift loading/unloading of pallets, and sectional gates). BS 4142 is the most appropriate tool for assessing these activities, as it provides a method for comparing the rating level of industrial and commercial sound against the prevailing background sound level.
- Relative Change in Ambient Level – applied to vehicle trips once they are on the highway. Clause 1 of BS 4142 expressly states that the method is not intended to be applied to the assessment of sound from vehicles on roads. For completeness, however, a relative change exercise has been undertaken to demonstrate the impact of vehicle trips in the context of existing highway traffic. This is a proportionate approach consistent with planning practice.

For clarity, the term LGV (Light Goods Vehicle) refers to vehicles with a gross vehicle weight not exceeding 3.5 tonnes, as defined in UK vehicle legislation. This vehicle class typically includes panel vans and small rigid vehicles such as the Ford Transit, Mercedes Sprinter, Vauxhall Movano and similar models.

LGVs are materially different from Heavy Goods Vehicles (HGVs) in both scale and acoustic signature: they produce lower sound power levels, do not require air-braking or air-suspension systems. LGVs are the only goods vehicles proposed to operate within the Site, and their use is representative of the consented B8 open-storage function.

5.1.2. Operational Assumptions

Operational input data has been provided by the Applicant and agreed for use in this assessment. The following scenarios have been modelled:

- Daytime (07:00–21:00): up to 14 car movements and 1 LGV movement (arrivals and departures) within a peak hour, together with a forklift truck manoeuvring and loading/unloading a pallet within the yard.

These assumptions represent a robust worst-case scenario for the purposes of the noise modelling.

5.1.3. Source Data

The source levels associated with the Proposed Development have been derived from Inacoustic's archive of empirical measurements undertaken at a range of comparable light-industrial and commercial sites. These measurements include LGV manoeuvres, car movements, forklift operations, pallet-handling activity, and electrically operated gates; all of which are directly relevant to the operational profile of the consented B8 open storage yard.

The use of empirical data ensures that the assessment is based on real-world acoustic behaviour, rather than generic assumptions or manufacturer data that may not reflect actual operating conditions. These datasets originate from controlled measurement exercises at locations with similar characteristics to those anticipated at this Site. This approach is standard practice for predicting commercial and industrial sound and provides a robust and representative basis for noise modelling.

The specific datasets used in the assessment include typical sound exposure levels (SELs) for transient events and $L_{Aeq,T}$ values for fixed sources. The values adopted are deliberately conservative, falling at or above the upper range of measured values across the dataset to ensure that the prediction exercise errs on the side of caution.

The source levels used in the modelling are summarised in Table 6, below.

TABLE 6: SOUND SOURCE DATA

Source	Distance / Description	Noise Level - dB	
		$L_{Aeq,T}$	SEL
LGV Arriving and Reversing	10 metres	-	77
LGV Departing	10 metres	-	82
Car Passby	10 metres	-	76
Reversing Manoeuvre	10 metres	-	68
Idling Engine	10 metres	-	73
Door Slams	10 metres	-	71
Car Pulling Away	10 metres	-	71
Fork Lift Truck	10 metres	-	82
Pallet Loading/Unloading	1 metre	73	-
Electronically Operated Entrance Gate	1 metre	52	-

5.1.4. Calculation Process

Calculations were carried out using iNoise 2024.3, which undertakes its calculations in accordance with guidance given in ISO9613-1:1993 and ISO9613-2:2024.

5.1.5. Sound Data Assumptions

Given that the land between the development and the nearest receptors is mixed, the ground factor has been set according to ground type. The ground area associated with the conurbation and area surrounding the site has been set with a ground factor of 0.2. Where there is significant green space, the ground factor has been set to 0.8.

The ambient temperature has been assumed to be 10°C, with a relative humidity of 70% and an Air Pressure of 101.33 kPa.

It has been assumed that all processes will occur simultaneously, representing a worst-case scenario. In order to accurately model the land surrounding the development, an AutoCAD DXF drawing was produced, which was based on data provided by the Ordnance Survey. The land contours throughout the area were modelled using Environment Agency LiDAR data with a resolution of 1 m.

LGVs and cars have been modelled using moving point sources with a velocity of 16 kph, the forklifts have been modelled using moving point sources with a velocity of 10 kph.

5.1.6. Specific Sound Level Map

A sound map of the predicted specific sound level arising from cumulative typical processes and operations at the closest receptors to the Site during the daytime period, and can be seen in Figure 3.

FIGURE 3: SPECIFIC SOUND LEVEL MAP OF CUMULATIVE OPERATIONS – DAYTIME



5.1.7. Specific Sound Level Summary

The predicted specific sound level arising from worst-case operations at the closest receptors to the Site, as shown in Figure 3, can be seen below in Table 7.

TABLE 7: PREDICTED SPECIFIC SOUND LEVEL SUMMARY

Receptor	Specific Sound Level at Façade dB(A)		
	Site	Vehicle Movements on Highway	Cumulative
Daytime			
R1	39	43	44
R2	41	41	44
R3	41	36	42
R4	34	28	35
R5	39	30	40

5.2. Assessment of Site Activities

5.2.1. Rating Penalty Principle

Section 9 of BS4142 describes how the rating sound level should be derived from the specific sound level, by determining a rating penalty.

BS4142 states:

“Certain acoustic features can increase the significance of impact over that expected from a basic comparison between the specific sound level and the background sound level. Where such features are present at the assessment location, add a character correction to the specific sound level to obtain the rating level. This can be approached in three ways:

- a) subjective method;*
- b) objective method for tonality;*
- c) reference method.”*

Given that the Proposed Development is not operational, the subjective method has been adopted to derive the rating sound level from the specific sound level. This is discussed in Section 9.2 of BS4142, which states:

“Where appropriate, establish a rating penalty for sound based on a subjective assessment of its characteristics. This would also be appropriate where a new source cannot be measured because it is only proposed at that time, but the characteristics of similar sources can subjectively be assessed.

Correct the specific sound level if a tone, impulse or other characteristics occurs, or is expected to be present, for new or modified sound sources.”

BS4142 defines four characteristics that should be considered when deriving a rating penalty, namely; tonality; impulsivity; intermittency; and other sound characteristics, which are defined as:

Tonality

A rating penalty of +2 dB is applicable for a tone which is *“just perceptible”*, +4 dB where a tone is *“clearly perceptible”*, and +6 dB where a tone is *“highly perceptible”*.

Impulsivity

A rating penalty of +3 dB is applicable for impulsivity which is *“just perceptible”*, +6 dB where it is *“clearly perceptible”*, and +9 dB where it is *“highly perceptible”*.

Other Sound Characteristics

BS4142 states that where *“the specific sound features characteristics that are neither tonal nor impulsive, though otherwise are readily distance against the residual acoustic environment, a penalty of +3 dB can be applied.”*

Intermittency

BS4142 states that when the *“specific sound has identifiable on/off conditions, the specific sound level ought to be representative of the time period of length equal to the reference time interval which contains the greatest total amount of on time ... if the intermittency is readily distinctive against the residual acoustic environment, a penalty of +3 dB can be applied.”*

5.2.2. Rating Penalty Assessment

In accordance with Section 9 of BS 4142:2014+A1:2019, a review has been undertaken to determine whether any rating penalties are warranted for the operational sound sources associated with the Proposed Development. The purpose of this exercise is to establish whether the character of the sound contains any acoustic features; such as tonality, impulsivity or distinct intermittency, that would increase its perceptibility or influence upon the acoustic environment at the nearest noise-sensitive receptors.

A detailed consideration of each potential sound characteristic is provided below, taking into account the nature of the proposed activities, the measured sound power data, and, importantly, the existing acoustic context at the Site, which includes regular road-traffic movements on Orchard Road and frequent rail pass-bys on the Cambridge–King’s Cross mainline. These existing sources dominate short-term fluctuations in the ambient and residual sound levels, and therefore form the baseline character against which new sources should be judged.

Tonality

The assessed sources; car movements, LGV manoeuvres, pallet-handling by forklift, and gate operations, do not contain tonal components.

Measured source spectra for LGVs and forklifts indicate relatively broadband emissions without narrow-band energy peaks that could result in a perceptible tone.

Accordingly, no tonality penalty is appropriate.

Impulsivity

Impulsive characteristics arise where short, sharp sounds (e.g. hammering, metal-on-metal impact) are evident. The operations within the yard do not involve percussive impacts or instantaneous strike-type noise. LGV manoeuvres are gradual; pallet movements are slow and considered; gate movements are powered and controlled.

There is no basis to expect sharp transients that would attract a penalty, and therefore no impulsivity correction is applied.

Intermittency

BS 4142 recognises intermittency where a sound *"has identifiable on/off conditions"*.

Vehicle movements and gate operations are, by nature, intermittent and readily identifiable within the reference period; though their duration is short and their frequency low.

To ensure the assessment remains appropriately conservative, a +3 dB penalty for intermittency has been applied. This modest uplift reflects the perceptibility of discrete events without overstating their effect on the rating level.

It is important to note that in the context of the Site, short-duration events occur against a backdrop of existing intermittent sources (particularly rail pass-bys), meaning the site activities do not introduce an unusual or uncharacteristic pattern of sound.

Other Sound Characteristics

No unusual, complex or contextually atypical acoustic features are expected to be present.

The form of activity; light-industrial manoeuvring, pallet handling and controlled gate operation, is entirely consistent with the prevailing character of the wider Anglian Business Park, and does not introduce any new sound qualities that would be unfamiliar within this setting.

Accordingly, no *"other characteristics"* penalty is required.

Considering the above, an assessment of the various sound sources associated with the Proposed Development, in terms of whether any rating penalties are applicable, and has been detailed in Table 8, below.

TABLE 8: RATING PENALTY ASSESSMENT

Source	Tonality	Impulsivity	Intermittency	Other Sound Characteristics	Discussion
Vehicle movements, forklift trucks, unloading/loading	0 dB	0 dB	+3 dB	0 dB	The on-site activities (car and LGV manoeuvres, forklift pallet handling, and gate cycles) are expected to exhibit a readily perceptible on/off pattern within the reference period. A +3 dB correction for intermittency has therefore been applied to the predicted specific sound levels. No penalties for tonality, impulsivity or other sound characteristics are considered appropriate in this case, as the sources are not expected to give rise to distinctive tones, sharp impulsive sounds, or unusual features beyond the normal character of activity within a business park environment.

In summary, a +3 dB correction for intermittency has been applied, with no additional rating penalties for tonality, impulsivity or other characteristics.

5.2.3. Uncertainty in Calculations

BS4142 requires that the level of uncertainty in the measured data and associated calculations is considered in the assessment. The Standard recommends that steps should be taken to reduce the level of uncertainty.

Measurement Uncertainty

BS4142 states that measurement uncertainty depends on a number of factors, including the following, which are applicable to the Proposed Development:

- “
- ...
 - b) *the complexity and level of variability of the residual acoustic environment;*
 - ...
 - d) *the location(s) selected for taking the measurements;*
 - ...
 - g) *the measurement time intervals;*
 - h) *the range of times when the measurements have been taken;*
 - i) *the range of suitable weather conditions during which measurements have been taken;*
 - ...
 - k) *the level of rounding of each measurement recorded; and*
 - l) *the instrumentation used.”*

Each of the measurement uncertainty factors outlined above have been considered and discussed in Table 9 below.

TABLE 9: MEASUREMENT UNCERTAINTY FACTORS

Measurement Uncertainty Factor Reference	Level of Uncertainty	Discussion
b)	0 dB	Residual acoustic environment is relatively constant, hence no correction for a complex residual acoustic environment.
d)	0 dB	Measuring adjacent to the closest affected receptor to the site, has enabled the determination of the worst-case background level.
g)	0 dB	Measurement time intervals were set in accordance with BS4142, hence no further correction needs to be made.
h)	0 dB	Measurements were undertaken over a continuous and substantial time period.
i)	0 dB	The measurement was accompanied by a meteorological survey, such that any adverse weather-affected periods could be excluded from the data analysis.
k)	0 dB	Measured values were rounded to 0.1 dB, therefore rounding would not have had a significant impact on the overall typical background sound levels.
l)	0 dB	The acoustic measurement equipment accorded with Type 1 specification of British Standard 61672, and were deployed with appropriate wind shields.

In summary, no correction has been included in the assessment, to account for measurement uncertainty.

Calculation Uncertainty

BS4142 states that calculation uncertainty depends on a number of factors, including the following, which are applicable to the Proposed Development:

- “ ...
- b) uncertainty in the operation or sound emission characteristics of the specific sound source and any assumed sound power levels;*
 - c) uncertainty in the calculation method;*
 - d) simplifying the real situation to “fit” the model (user influence on modelling); and*
 - e) error in the calculation process.”*

Each of the calculation uncertainty factors outlined above have been considered and discussed in Table 10 below.

TABLE 10: CALCULATION UNCERTAINTY FACTORS

Calculation Uncertainty Factor Reference	Level of Uncertainty	Discussion
b)	0 dB	Sound emission data is based on robust archive data and absolute worst-case assumptions of likely operations.
c)	0 dB	Calculations were undertaken in accordance with ISO 9613-2, which is considered a “ <i>validated method</i> ” by BS4142.
d)	0 dB	The real situation has not been simplified for the purposes of this assessment; however an operational scenario has been assumed for the purposes of the assessment.
e)	0 dB	ISO 9613-2 indicates that there is a ± 3 dB accuracy to the prediction method, however, no corrections are considered necessary, given the unlikely nature of the worst-case scenario considered.

In summary, no uncertainty budget has been considered in the assessment, to account for calculation uncertainty.

The overall uncertainty is considered to be small enough that it would not affect the conclusions of the assessment.

5.2.4. Rating Sound Level

Incorporating the rating penalties detailed in Section 5.2.2 with the predicted specific sound levels, as detailed in Table 7, the rating sound levels have been derived and have been detailed in Table 11 below.

TABLE 11: RATING SOUND LEVELS

NSR	Specific Sound Level (dB)	Rating Sound Level (dB)
1	39	42
2	41	44
3	41	44
4	34	37
5	39	42

5.2.5. BS4142:2014+A1:2019 Assessment

The rating sound level, as calculated from the predicted specific sound level, has been assessed in accordance with BS 4142:2014+A1:2019, considering site activities only (car and LGV movements within the yard, forklift pallet handling, and sectional gate operation) at all NSRs.

The resultant assessment summary, during the daytime period, can be seen in Table 12.

TABLE 12: DAYTIME BS4142:2014+A1:2019 ASSESSMENT SUMMARY

NSR	Rating Sound Level (dB)	Daytime Background Sound Level (dB)	Excess of Rating over Daytime Background Sound Level (dB)
1	42	44	-2
2	44	44	0
3	44	44	0
4	37	44	-7
5	42	44	-2

It can be seen that the Proposed Development, in its assessed form is likely to have a '*low impact*' at the nearest noise-sensitive receptors during the day.

5.2.6. Effect on the Ambient Sound Environment – Residential Receptors

The differential between the predicted specific noise levels at each residential receptor, when compared to the measured ambient $L_{Aeq,T}$ levels in the area would ensure that no significant increase in the prevailing ambient sound level would occur during the daytime period.

5.2.7. Discussion and Operational Recommendations

The assessment indicates that noise emissions from typical site activities; namely car and LGV movements within the yard, forklift pallet handling, and operation of the sectional gates, would result in low levels of audibility at the nearest residential properties. Predicted Rating Levels are at or below background sound levels, consistent with a '*low impact*' outcome in BS 4142-terms.

BS 4142:2014+A1:2019 requires the assessor to compare the rating level; the equivalent continuous sound level over the relevant reference period, including any applicable penalties, with the representative background sound level. This approach inherently takes account of the duration, frequency and pattern of the sound sources being assessed.

The operational activities associated with the Site; such as LGV manoeuvres, short forklift cycles, and occasional pallet handling, typically occur for only a small proportion of the one-hour (daytime) reference periods. For the remainder of the reference period, these sources are inactive and contribute no sound energy. When the full reference period is considered, the short-duration energy of these events is averaged across the entire timeframe, resulting in a representative equivalent continuous level.

It is therefore entirely normal, and fully consistent with the design of the Standard, for the resulting rating level to be lower than the measured background level even where individual events may be

briefly audible at the moment they occur. This reflects the purpose of BS 4142's reference-period averaging: to evaluate the overall contribution and potential effect of an industrial or commercial sound source, rather than its instantaneous maximum level.

In the context of this assessment, the predicted rating levels appropriately reflect the intermittent, short-duration and low-intensity nature of the on-site activities. The comparison with the measured background levels confirms that the resulting impact remains *Low* in BS 4142 terms, with the rating level remaining below background during all proposed operating hours. This indicates that the sound from the Proposed Development would not be expected to give rise to adverse noise effects at nearby residential receptors.

5.3. Assessment of Highway Traffic Movements

As set out in Section 5.1, BS 4142:2014+A1:2019 is not applicable to traffic noise once vehicles are on the public highway, since Clause 1 of the Standard specifically excludes road traffic movements from its scope. However, for completeness, the potential influence of additional vehicle trips associated with the Site has been considered in terms of the relative change in overall ambient sound level at the nearest residential receptors.

Predicted additional traffic flows are based on the agreed operational profile (14 car and 1 LGV trips in the peak daytime hour). These movements have been added to the measured ambient sound levels to determine the combined sound level at receptors, and are presented below in Table 13.

TABLE 13: PREDICTED CHANGE IN AMBIENT NOISE LEVEL ARISING FROM ACCESS ROAD TRAFFIC

Receptor	Sound Level - dB			
	Specific Sound Level: $L_{Aeq,1-hour}$	Existing Ambient Level: $L_{Aeq,T}$	Future Ambient Level: $L_{Aeq,T}$	Change in Ambient Level
Daytime				
1	44	51	51.8	+0.8
2	44	51	51.8	+0.8
3	42	51	51.5	+0.5
4	35	51	51.1	+0.1
5	40	51	51.3	+0.3

The assessment in Table 13 identifies relative changes of +0.1 to +0.8 dB during the daytime across the receptors considered.

On the basis of established acoustic guidance, changes of less than 1 dB are not perceptible and therefore represent a negligible impact. The additional vehicle trips are therefore not expected to result in any material change to the existing acoustic environment along Orchard Road and the wider local highway network.

5.4. Compliance with Policy D3 of the Local Plan

Policy D3 of the Local Plan requires that development proposals demonstrate that they do not cause unacceptable harm to the living conditions of nearby occupiers. The revised operating hours have been framed specifically to ensure that the acoustic environment during all periods of proposed activity is appropriate for a mixed commercial-residential interface.

The original restriction on operating hours was imposed to protect residential amenity during the overnight period, when background sound levels are likely to be at their lowest and sensitivity to noise is highest. No operations are proposed between 21:00 and 07:00 Monday to Friday, or outside 09:00-16:00 on Saturdays, ensuring that the part of the day most sensitive to noise is fully preserved.

Across the full set of proposed operating hours, the BS 4142 assessment predicts rating levels below the representative background sound level at all receptors. This corresponds to a *Low Impact* under BS 4142 and a *No Observed Adverse Effect Level (NOAEL)* in terms of the Planning Practice Guidance for Noise. As such, the noise generated by the consented use, operating within the revised time limits, would not give rise to adverse effects on residential living conditions.

The scheme avoids the sensitive overnight period, and removes any potential for unacceptable harm through the combination of measured baseline evidence and conservative rating-level predictions.

It is also relevant to note that the currently permitted hours already allow operation during the daytime period. The revised hours do not introduce activity into any period associated with greater residential sensitivity. The weekday operating window remains wholly within the BS 4142 daytime definition, and the proposed hours on Saturdays, together with complete closure on Sundays and Bank Holidays, represents a position materially equivalent to that already consented. Accordingly, the proposal does not alter the fundamental nature or acoustic context of operations at the Site.

Accordingly, the proposal accords with Policy D3 in full.

6. CONCLUSION

inacoustic has been commissioned to assess the potential noise impact arising from the operation of the consented B8 Open Storage Yard at Anglian Business Park, Orchard Road, Royston.

This technical noise assessment has been prepared to accompany a Section 73 planning application to North Hertfordshire District Council, which seeks to vary the existing hours of operation to 07:00–21:00 Monday to Friday, 09:00–16:00 Saturday, and closed on Sundays and Bank Holidays. No other changes to the approved development are proposed. The assessment is based on environmental noise measurements undertaken at the Site and subsequent noise predictions representing a robust worst-case operating scenario.

The assessment considers the potential noise emissions associated with peak activity during both daytime periods, including car and LGV manoeuvres within the yard, forklift pallet handling, and the operation of the electrically powered gates.

Across all proposed operating hours, the predicted BS 4142 Rating Levels remain at or below the representative background sound level, corresponding to a *Low Impact* in BS 4142 terms. On this basis, the resulting noise effects are assessed as falling within the *No Observed Adverse Effect Level (NOAEL)* in accordance with the Planning Practice Guidance for Noise.

For clarity, the PPG:N definition of a *No Observed Adverse Effect Level* is reproduced below:

“Noise can be heard, but does not cause any change in behaviour, attitude or other physiological response. Can slightly affect the acoustic character of an area but not such that there is a change in the quality of life.”

The assessment therefore demonstrates that the proposed variation to operating hours would not give rise to adverse effects on residential living conditions and that the development complies with the aims of BS 4142, the NPPF, PPG:Noise, and Policy D3 of the North Hertfordshire Local Plan.

Accordingly, noise should not be considered a constraint to the approval of this Section 73 planning application.

7. APPENDICES

7.1. Appendix A – Definition of Terms

Sound Pressure	Sound, or sound pressure, is a fluctuation in air pressure over the static ambient pressure.
Sound Pressure Level (Sound Level)	The sound level is the sound pressure relative to a standard reference pressure of 20µPa (20x10 ⁻⁶ Pascals) on a decibel scale.
Decibel (dB)	A scale for comparing the ratios of two quantities, including sound pressure and sound power. The difference in level between two sounds s1 and s2 is given by 20 log10 (s1 / s2). The decibel can also be used to measure absolute quantities by specifying a reference value that fixes one point on the scale. For sound pressure, the reference value is 20µPa.
A-weighting, dB(A)	The unit of sound level, weighted according to the A-scale, which takes into account the increased sensitivity of the human ear at some frequencies.
Noise Level Indices	Noise levels usually fluctuate over time, so it is often necessary to consider an average or statistical noise level. This can be done in several ways, so a number of different noise indices have been defined, according to how the averaging or statistics are carried out.
$L_{eq,T}$	A noise level index called the equivalent continuous noise level over the time period T. This is the level of a notional steady sound that would contain the same amount of sound energy as the actual, possibly fluctuating, sound that was recorded.
$L_{max,T}$	A noise level index defined as the maximum noise level during the period T. L_{max} is sometimes used for the assessment of occasional loud noises, which may have little effect on the overall L_{eq} noise level but will still affect the noise environment. Unless described otherwise, it is measured using the 'fast' sound level meter response.
$L_{90,T}$	A noise level index. The noise level exceeded for 90% of the time over the period T. L_{90} can be considered to be the "average minimum" noise level and is often used to describe the background noise.
$L_{10,T}$	A noise level index. The noise level exceeded for 10% of the time over the period T. L_{10} can be considered to be the "average maximum" noise level. Generally used to describe road traffic noise.
Free-Field	Far from the presence of sound reflecting objects (except the ground), usually taken to mean at least 3.5m
Facade	At a distance of 1m in front of a large sound reflecting object such as a building façade.
Fast Time Weighting	An averaging time used in sound level meters. Defined in BS 5969.

In order to assist the understanding of acoustic terminology and the relative change in noise, the following background information is provided.

The human ear can detect a very wide range of pressure fluctuations, which are perceived as sound. In order to express these fluctuations in a manageable way, a logarithmic scale called the decibel, or dB scale is used. The decibel scale typically ranges from 0 dB (the threshold of hearing) to over 120 dB. An indication of the range of sound levels commonly found in the environment is given in the following table.

TABLE 14: TYPICAL SOUND LEVELS FOUND IN THE ENVIRONMENT

Sound Level	Location
0dB(A)	Threshold of hearing
20 to 30dB(A)	Quiet bedroom at night
30 to 40dB(A)	Living room during the day
40 to 50dB(A)	Typical office
50 to 60dB(A)	Inside a car
60 to 70dB(A)	Typical high street
70 to 90dB(A)	Inside factory
100 to 110dB(A)	Burglar alarm at 1m away
110 to 130dB(A)	Jet aircraft on take off
140dB(A)	Threshold of Pain

The ear is less sensitive to some frequencies than to others. The A-weighting scale is used to approximate the frequency response of the ear. Levels weighted using this scale are commonly identified by the notation dB(A).

In accordance with logarithmic addition, combining two sources with equal noise levels would result in an increase of 3 dB(A) in the noise level from a single source.

A change of 3 dB(A) is generally regarded as the smallest change in broadband continuous noise which the human ear can detect (although in certain controlled circumstances a change of 1 dB(A) is just perceptible). Therefore, a 2 dB(A) increase would not be normally be perceptible. A 10 dB(A) increase in noise represents a subjective doubling of loudness.

A noise impact on a community is deemed to occur when a new noise is introduced that is out of character with the area, or when a significant increase above the pre-existing ambient noise level occurs.

For levels of noise that vary with time, it is necessary to employ a statistical index that allows for this variation. These statistical indices are expressed as the sound level that is exceeded for a percentage of the time period of interest. In the UK, traffic noise is measured as the L_{A10} , the noise level exceeded for 10% of the measurement period. The L_{A90} is the level exceeded for 90% of the time and has been adopted to represent the background noise level in the absence of discrete events. An alternative way of assessing the time varying noise levels is to use the equivalent continuous sound level, L_{Aeq} .

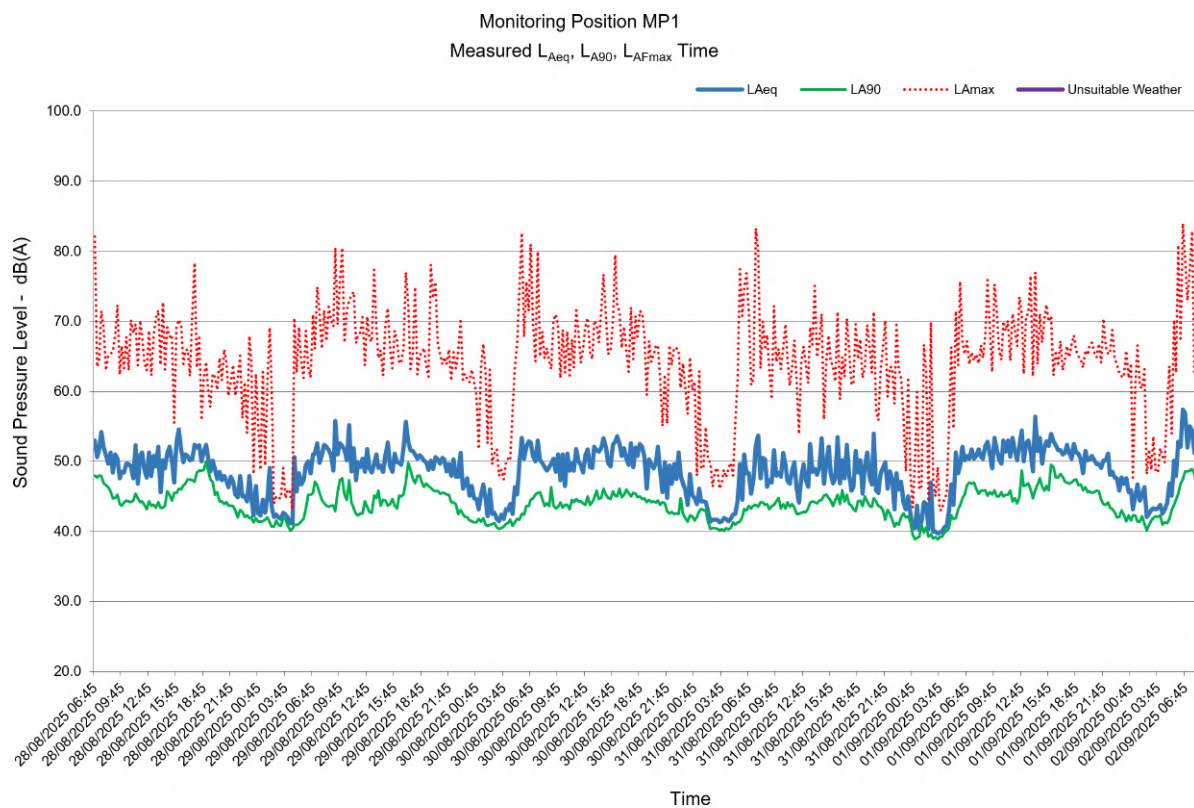
This is a notional steady level that would, over a given period of time, deliver the same sound energy as the actual fluctuating sound.

To put these quantities into context, where a receiver is predominantly affected by continuous flows of road traffic, a doubling or halving of the flows would result in a just perceptible change of 3 dB, while an increase of more than 25%, or a decrease of more than 20%, in traffic flows represent changes of 1 dB in traffic noise levels (assuming no alteration in the mix of traffic or flow speeds).

Note that the time constant and the period of the noise measurement should be specified. For example, BS 4142 specifies background noise measurement periods of 1 hour during the day and 15 minutes during the night. The noise levels are commonly symbolised as $L_{A90,1\text{hour}}$ dB and $L_{A90,15\text{mins}}$ dB. The noise measurement should be recorded using a 'FAST' time response equivalent to 0.125 ms.

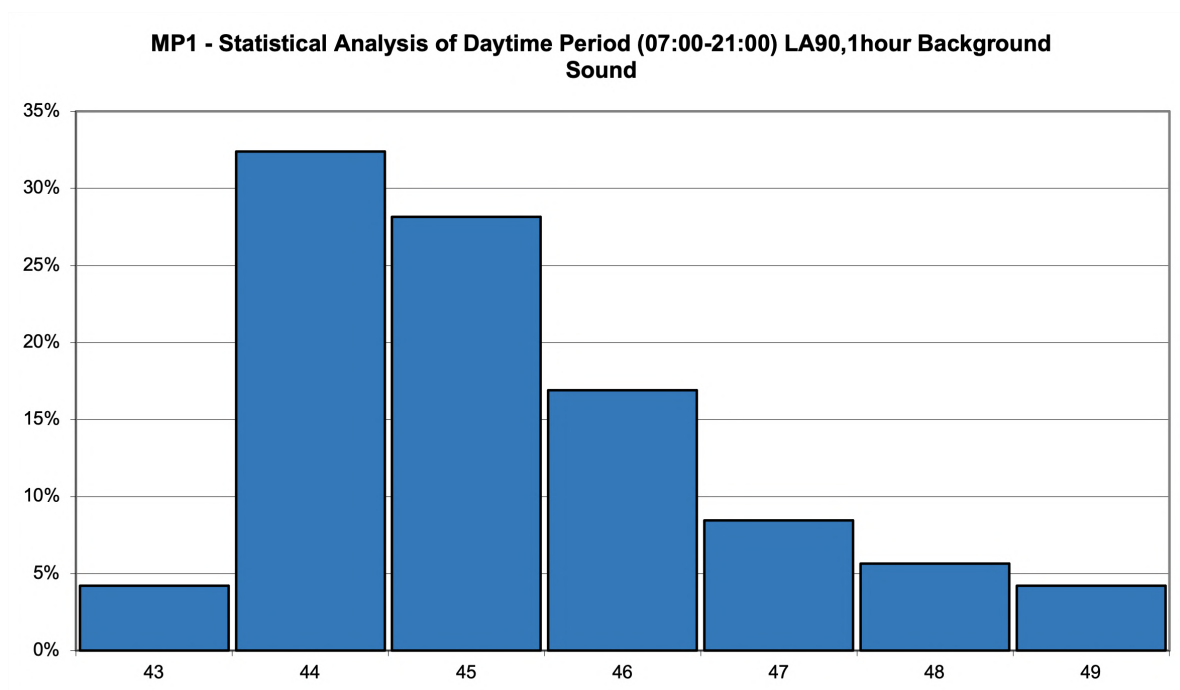
7.2. Appendix B – Tabulated Measurement Results

FIGURE 4: MEASURED TIME HISTORY



7.3. Appendix C – Statistical Analysis

FIGURE 5: STATISTICAL ANALYSIS OF L_{A90} BACKGROUND – DAYTIME – MP1



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