

Noise Assessment

The Golden Lion – Luddesdown Road



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Non-Technical Summary

What is Proposed?	Redevelop and extension of The Golden Lion pub/restaurant in Luddesdown, Kent
What is the Problem?	The site is located near residential areas and the proposed changes could result in additional operational noise from the development which could have an effect on the local environment.
What is the Result?	The assessment has shown that both operational plant noise and patron noise are not expected to have an adverse effect on nearby noise-sensitive receptors when assessed in accordance with BS 4142:2014 guidance and compared to existing conditions respectively. Recommendations with respect to operational plant noise limits, should they be required, and internal acoustics to be considered as part of the more detailed stages are included in this report.

Report Record

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1.0 Introduction

- 1.1 Redevelopment and extension works are proposed at the existing The Golden Lion pub/restaurant in the rural Luddesdown village near Gravesend, Kent.
- 1.2 The proposals involve the demolition of a number of ancillary buildings to make way for a new single-storey rear extension to provide a kitchen and additional restaurant space.
- 1.3 The proposed changes could result in additional operational noise from the site which could have an effect on the local environment. To determine these potential changes in noise and whether they could have detrimental effect, a noise assessment has been undertaken. This report presents the findings of the noise assessment.

What is a Noise Assessment?

- 1.4 A Noise Assessment will determine if and to what extent existing or future noise sources could affect noise-sensitive receptors, and importantly, if those noise sources could have an adverse impact. If the Noise Assessment finds that the level of risk or impact is unacceptable, mitigation measures will need to be applied to the development.
- 1.5 The Noise Assessment will consider the prevailing sound environment to determine potential noise sources including traffic, aircraft or other noise generating activities, such as mechanical plant, generators etc. The report will provide an impact assessment and give actionable recommendations. Recommendations may include solutions involving changes to design, layout and construction methods, so that the impacts from noise can be reduced to acceptable levels. Often these mitigation measures can be incorporated into standard construction practices. Find out more about how we undertake Noise Assessments including FAQ [here](#).
- 1.6 Understanding and reducing the impacts ensures that you have a safe and compliant site. When dealing with planning, the National Planning Policy Framework (NPPF) and associated policies require an appropriate noise assessment at the initial planning stage, whilst the ProPG: Planning & Noise Professional Practice Guidance on Planning & Noise New Residential Development May 2017 requires delivery of sustainable development by promoting good health and wellbeing through the effective management of noise.

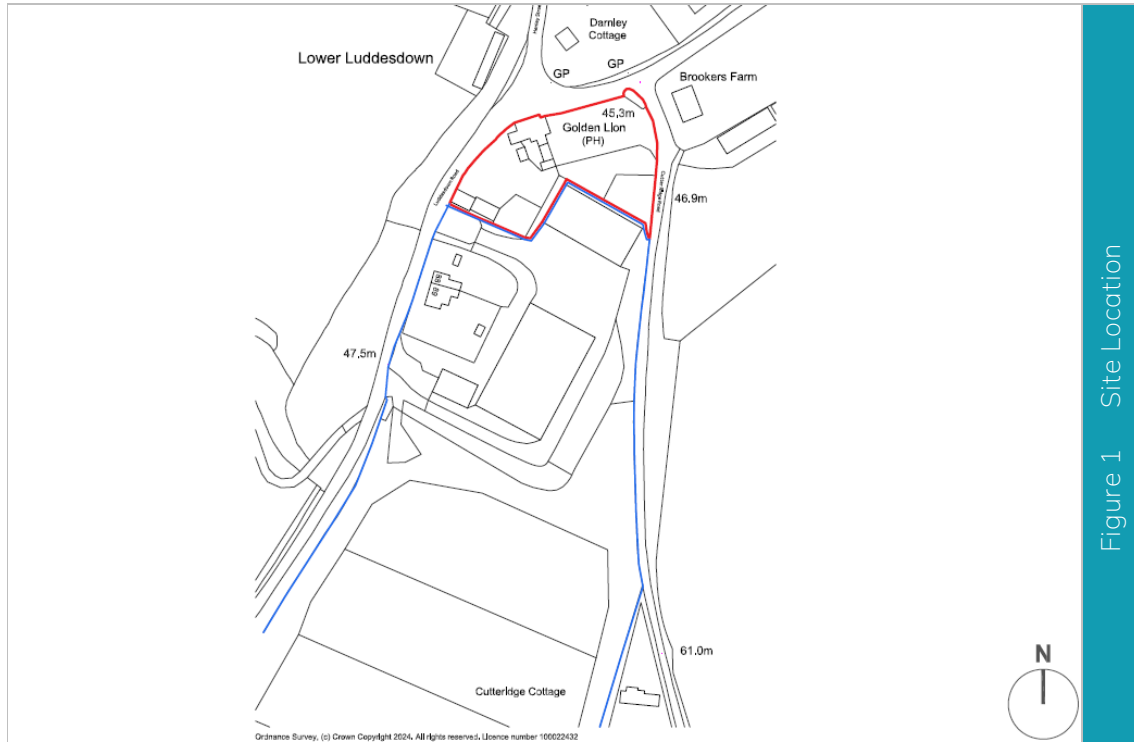


The Subject Site

Table 1 Site Details

Address	The Golden Lion, Luddesdown Road, Gravesend DA13 0XE
Eastings, Northings	567227, 166684
Local Planning Authority	Gravesham Borough Council

- 1.7 The site comprises The Golden Lion public house/restaurant located in Luddesdown, a rural village near Gravesend, Kent. The north/eastern half of the site comprises a car park, and a large pub garden is situated towards the south of the property. The site is bordered by Luddesdown Road to its west and The Silverhand Estate winery/shop to the south/east.
- 1.8 Towards the north of the Golden Lion are two residential properties, namely Brookers Farm and Darnley Cottage. There are two further properties, no. 88 and 89 Luddesdown Road, south of the site which are also of a residential nature. However, it is understood that both these properties are part of the Silverhand Estate (which The Golden Lion is also part of). The garden areas of these properties have direct line of sight to the operations area and are, as such, much more exposed to existing noise from the winery. Therefore, besides these receptors being less sensitive to noise due to existing conditions it can also be argued that any noise arising due to the proposal would be self-inflicted. Hence, these properties have been treated as less sensitive than others as part of this assessment.
- 1.9 The site application area is shown in Figure 1 below.



The Proposed Development

- 1.10 It is understood that, as part of their Silverhand Estate development plans, MDCV UK are looking to redevelop and extend The Golden Lion pub/restaurant. The proposals involve the demolition of a number of ancillary buildings to make way for a new single-storey rear extension to provide a kitchen and space for up to 50 restaurant covers with associated dedicated toilets.
- 1.11 Outdoor seating areas will be retained although with rearrangements to the pub garden proposed such as relocation of the outdoor bar from its current position adjacent to the building to the southern end of the pub garden. Re-organisation and a slight enhancement, including landscaping, to the existing car park are also proposed.
- 1.12 Additionally, it understood that the proposal does not involve introduction of any new noisy plant. Current plant items such as the kitchen mechanical ventilation extraction unit are understood to be retained, albeit in a slightly different position due to the new kitchen location.
- 1.13 The proposed site plan is shown in the Figure 2 below.

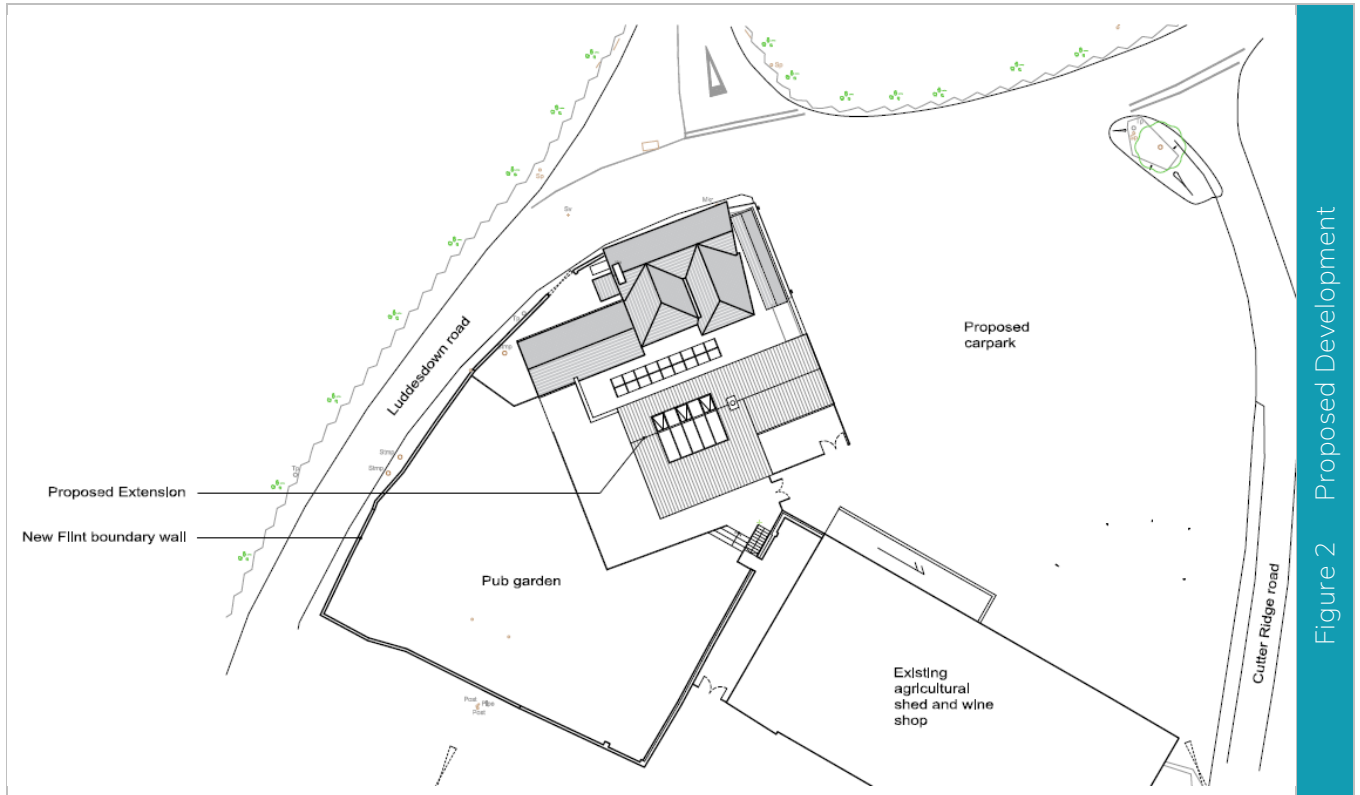


Figure 2 Proposed Development

Report Structure, Limitations & Changes

- 1.14 The report structure generally follows the pollution linkage approach described above. Chapter 2 of the report sets out the assessment methodology. Chapter 3 discusses the baseline noise conditions, with the potential for future operational noise presented in Chapter 4. Some acoustic recommendations presented in Chapter 5 and, lastly, report summary and conclusions are set out in Chapter 6.
- 1.15 There are a lot of technical terms in this report and definitions are provided in Appendix A. Appendix B details some of the relevant policy/guidance that this assessment is based on as well as acoustic criteria/thresholds. Extracts of the noise survey data and analysis are provided in Appendix C.
- 1.16 This assessment has been undertaken in accordance with our Terms & Conditions. Full details on limitations and reliance are provided in those Terms. Third party information which has been reviewed and used to inform the assessments presented herein, including public records held by various regulatory authorities and environmental database data has been assumed to be true and accurate.



- 1.17 This assessment has been carried out to determine the potential risks posed to nearby noise-sensitive receptors, based on the current development. Should revisions in the development proposals result in a change in any assessment parameters detailed in this report, a re-assessment of the risk should be carried out.



2.0 Assessment Methodology

Introduction

- 2.1 This chapter lists the target noise sources identified from a review of Google Earth / Street View, from any client or regulator information and from observations made during deployment of monitoring equipment / site visits. In addition, this section details the methodology for the noise monitoring equipment deployment and survey standards.

Acoustic Criteria

- 2.2 Reference has been made to a number of design requirements/guidance to determine the acoustic design criteria for the proposed development. In summary, these include:
- ▶ Local Planning Authority (Gravesham Borough Council) requirements
 - ▶ BS 8233:2014 'Guidance on Sound Insulation and Noise Reduction for Buildings'
 - ▶ BS 4142:2014+A1(2019) - Methods for rating and assessing industrial and commercial sound
- 2.3 The above are discussed in more detail below.

Local Policy

- 2.4 Gravesham Borough Council's Supplementary Planning Document DESIGN FOR GRAVESHAM Design Code (May 2024) provides high level requirements with respect to residential amenity:

Private amenity space must be provided for all new flats and maisonettes subject to taking into consideration outlook, orientation, micro-climatic conditions (including noise, air quality and wind).

- 2.5 The Supplementary Planning Document does not include reference to specific noise guidance or standards. However, from previous project experience in the area, Gravesham Borough Council would typically look for noise assessments for new/altered commercial developments to be undertaken with due regard to British Standards 8233:2014 and 4142:2014.



BS 8233:2014 Guidance on Sound Insulation and Noise Reduction for Buildings

2.6 BS 8233 'Guidance on sound insulation and noise reduction for buildings' provides guidance on indoor ambient noise levels for various situations.

2.7 The relevant guideline limits for dwellings are shown in Table 2.

Table 2 BS 8233 Indoor Ambient Noise Levels for Dwellings			
Activity	Location	Daytime (07:00 – 23:00)	Night-time (23:00 – 07:00)
Resting	Living room	35 dB $L_{Aeq,16h}$	—
Dining	Dining room/area	40 dB $L_{Aeq,16h}$	—
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,16h}$	30 dB $L_{Aeq,8h}$

2.8 It is important to note that the above guideline noise level limits are applicable to 'anonymous' noise sources such as steady traffic and general distant urban noise.

2.9 In terms of the guideline noise limits, BS 8233 guidance does state that a 5 dB relaxation may be applied where a development is necessary or desirable:

Where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal target levels may be relaxed by up to 5 dB and reasonable internal conditions still achieved.

2.10 In terms of outdoor amenity spaces, BS 8233:2014 offers the following guidance:

"For traditional external areas that are used for amenity space, such as gardens and patios, it is desirable that the external noise level does not exceed 50dB LAeq, with an upper guideline value of 55dB LAeq which would be acceptable in noisier environments. However, it is also recognised that these values are not achievable in all circumstances where development might be desirable. In higher noise areas, such as city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs



can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces but should not be prohibited.”

BS 4142:2014 – ‘Methods for Rating and Assessing Industrial and Commercial Sound’

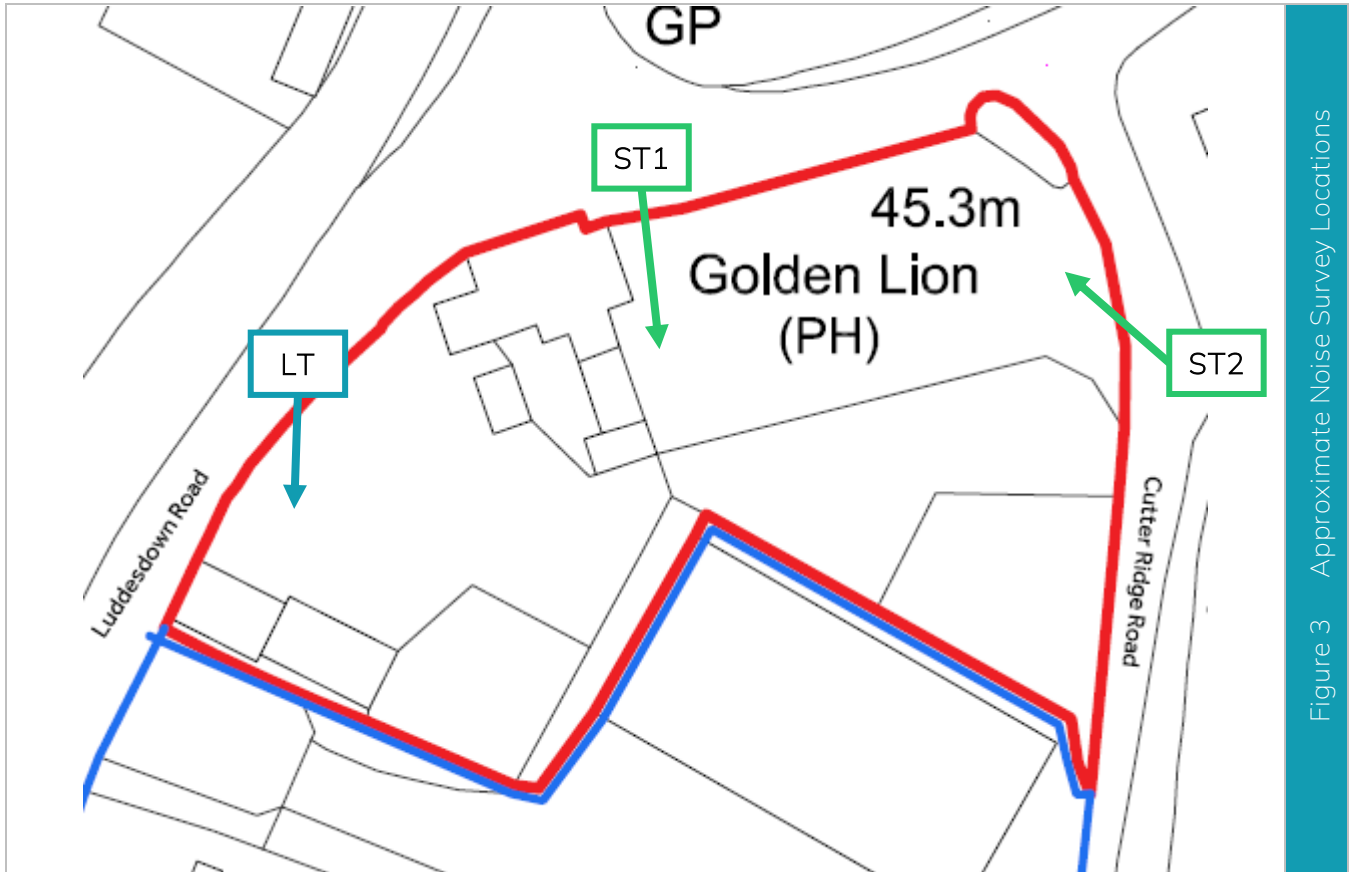
- 2.11 BS 4142:2014 describes methods for assessing the likelihood of adverse comment arising as a result of commercial or industrial noise. The methodology requires the determination of the ‘noise rating level’ (or $L_{A,r,Tf}$) for the noise source(s) being assessed, which is the noise of the plant plus corrections for acoustic characteristics which attract attention, e.g. tonality, impulsivity, intermittency, etc.
- 2.12 The noise rating level is then compared against the prevailing ‘background sound level’ (or $L_{A90,T}$) at the noise-sensitive receptor considering the following guidance:
- ▶ Typically, the greater the difference, the greater the magnitude of the impact;
 - ▶ A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context;
 - ▶ A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context; and
 - ▶ The lower the rating 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. When 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.
- 2.13 It shall be noted that whilst the comparison of the ‘noise rating level’ against the prevailing background sound level for determining the potential impact is an important step of any BS 4142 assessment, consideration of the context in which the noise occurs can be equally as important. Equally, the magnitude of the noise in question can also be an important consideration.



Baseline Noise Survey

Methodology

- 2.14 A long-term (LT) unattended baseline noise survey has been undertaken from Thursday 28th November 2024 to Tuesday 3rd December 2024 using a Norsonic Nor-140 precision Class I sound level meter (serial no. 1405197). The meter was set to log sound levels in contiguous 5-minute periods. Along the broadband noise levels, spectral data was also collected as were audio recordings for any 'events' above 65 dB(A) L_p .
- 2.15 The microphone was mounted on a tripod at a height of approximately 1.5 m. This measurement position was within The Golden Lion pub garden and is considered reasonably representative of the noise environment at the surrounding noise-sensitive receptors. Note that the pub garden was not in use during the survey.
- 2.16 From experience, it has been found that using 5-minute survey data provides very similar (if not the same) results as 15-minute or 1-hour survey data but with more detailed representation of the L_{max} data and the added flexibility with respect to post-processing of the data where required.
- 2.17 In addition to the above, two short-term attended noise surveys were undertaken on Thursday 28th November 2024 using the same Norsonic Nor-140 sound level meter discussed above. The first survey (ST1) was carried out within the car park at 3 m from the existing ventilation extract plant operating at full capacity. The second at 32 m from the east façade of the public house, representative of conditions at the Darnley Cottage and Brookers Farm neighbouring dwellings, from around 12:26 to 13:40 hours. Darnley Cottage and Brookers Farm are key noise sensitive receptors due to the distance from the mechanical plant.
- 2.18 For both short-term measurements, the sound level meter was set up on a tripod at around a 1.5 m height in free-field positions. The approximate noise monitoring positions are shown in Figure 3.



2.19 The photos below show the LT and ST noise survey set ups.



ST1 monitoring position



LT monitoring position



ST2 monitoring position



- 2.20 Pre- and post-survey calibration checks were carried out which confirmed that no significant drift (+0.2 dB) had occurred during the survey. The calibration checks were undertaken using a Norsonic Nor1255 calibrator (serial no. 125525497).
- 2.21 All equipment used for the baseline noise survey had valid calibration certificates at the time of the survey, which are available upon request. The survey also conformed to the best practice data acquisition methodologies as set out in BS 7445¹.

Meteorological Conditions

- 2.22 Meteorological conditions during the measurement period were generally in line with recommendations for environmental noise surveys, with minimal wind (<5m/s) during the survey. An air temperature generally between 1°C and 15°C was noted during the survey. The conditions were noted as mostly partly sunny, except for Thursday 1st December when there was light precipitation, although this does not appear to have affected the survey results.

¹ British Standard 7445 – Description and measurement of environmental noise



3.0 Baseline Survey Results

Existing Environment

- 3.1 At the time of setting up and collecting the noise survey, the main noise sources affecting the area surrounding The Golden Lion were observed to be birdsong, local road noise (particularly farm-related traffic such as JCBs and tractors) and at times low level noise from the neighbouring Silverhand winery. Occasional aircraft flyover noise and very faint distant (presumably M2 motorway) traffic noise could also be heard. Notwithstanding the occasional elevated farm-related noise, the overall noise environment was observed as tranquil and typical of a rural setting.
- 3.2 In addition to the 'generic' noise in the area, nearby noise-sensitive receptors are also exposed to existing operational noise such as patron noise (from the pub garden) and generic operational noise associated with The Golden Lion. It is also understood that from time to time, additional noise from music and other events would occur.
- 3.3 It is of note that the existing operation is of useful context due to the commercial business having patron and plant noise that have been running prior to this proposal, as is understood from client conversations, without complaint from nearby noise-sensitive receptors.



Long Term Survey (LT) Results

- 3.4 A summary of the long term baseline noise level measurement results and derived values are presented below in Table 3. An overview of the LT survey results in graphical format is presented in Appendix C, with full data available if required upon request.

Table 3 Summary of Measured Noise Levels at the LT Survey Location				
Period		Noise Levels (dB)		
		Ambient, $L_{Aeq}^{[1]}$	Maximum, $L_{AFmax}^{[2]}$	Background, $L_{A90}^{[4]}$
Weekday	Daytime (07:00 – 23:00)	47	66	39
	Night-time (23:00 – 07:00)	39	55	35
Weekend	Daytime (07:00 – 23:00)	44	64	37
	Night-time (23:00 – 07:00)	40	56	36

Notes to Table 3:

[1] Logarithmic average, [2] Arithmetic average of the 5-minute values, [4] Values representative of the prevailing background sound levels.

- 3.5 As can be seen from the noise survey results in the above table, the weekday daytime (07:00 – 23:00) ambient noise level is in the region of 47 dB L_{Aeq} with the average of 5-minute maximum noise levels being around 66 dB L_{Amax} . The representative background daytime sound level is 39 dB(A).
- 3.6 When looking at noise survey results in the above table, the weekend daytime (07:00 – 23:00) ambient noise level is in the region of 44 dB L_{Aeq} with the average of 5-minute maximum noise levels being around 64 dB L_{Amax} . The representative background daytime sound level is 37 dB(A). These results are only slightly lower than the weekday values but still comparable.
- 3.7 In terms of the weekday night-time period, an ambient noise level of around 39 dB L_{Aeq} and 55 dB $L_{AF,max}$ maximum noise from discrete events can be expected at the LT measurement position with the representative background sound level around 35 dB(A).

- 3.8 Lastly, when considering the weekend night-time period, the ambient noise level was around 40 dB L_{Aeq} and the maximum noise level from discrete events at the LT position can be considered 56 dB $L_{AF,max}$. Representative background sound levels in this period and position are around 36 dB(A).
- 3.9 Note that the night-time noise level values are included for information only as the proposed development would not be trading during the 23:00 – 07:00 night-time period.

Background Sound Levels

- 3.10 The weekday and weekend daytime background sound levels presented in Table 3 above of 39 and 37 dB(A) respectively are of similar level. Additionally, when considering all daytime background levels during measurement period, an overall background sound level of 37 dB(A) is derived. Analysis results of this can be seen below in Figure 4.

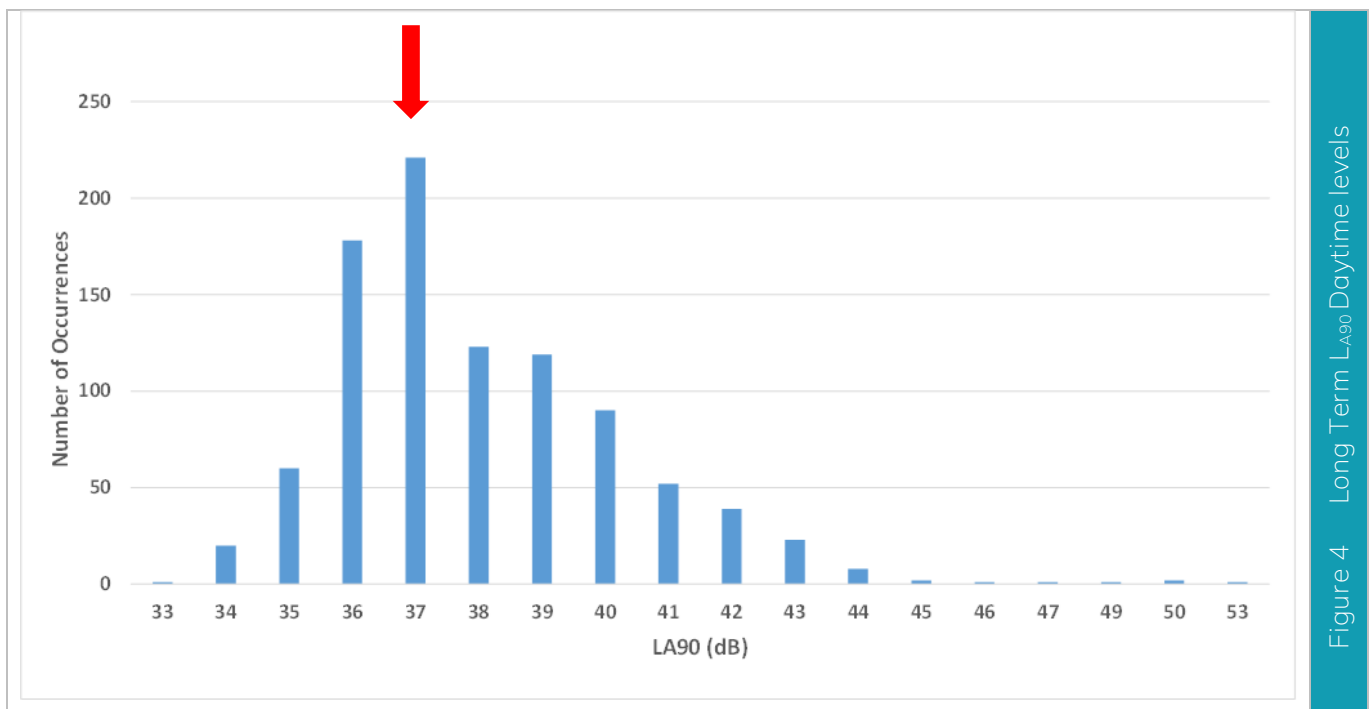


Figure 4 Long Term L_{A90} Daytime levels

- 3.11 In light of the above, 37 dB(A) can be considered representative of the surrounding area and has subsequently been used for the BS 4142:2014 calculations. Note that analysis of the data for opening times has also been undertaken, which shows the same 37 dB L_{A90} background sound value being representative.



Short Term Survey Results

- 3.12 For the ST1 survey a noise level of 48 dB L_{Aeq} at a distance of 3 m from kitchen extraction unit was captured. The noise from the extract fan was very stable and consistent, as such only a short measurement period was necessary.
- 3.13 The results of the attended noise survey ST2 are presented below in Table 4. A more detailed breakdown of the survey data for ST1 and ST2 is also shown in Appendix C.

Table 4 Summary of Measured Noise Levels at ST2

Location and Period	Noise Levels (dB)			
	Ambient, L_{Aeq} [1]	Maximum, L_{AFmax}	Traffic, L_{A10} [2]	Background, L_{A90} [3]
ST2 (12:26-13:40)	53	63 to 75	52	36

Notes to Table 4:

[1] Logarithmic average, [2] Arithmetic average of the 5-minute values, [3] L_{A90} modal value.

- 3.14 At measurement position ST2 (close to Brookers Farm), an ambient sound level of around 53 dB L_{Aeq} was captured, with the 5-minute maximum sound levels varying from around 63 dB to 75 dB L_{Amax} . Analysis showed that the most occurring background sound level during the ST 2 survey was 36 dB L_{A90} , which can be considered representative of the prevailing background noise levels at the nearest residential façade of Brookers Farm.
- 3.15 Also note that the ST2 background sound level close to Brookers Farm is very much comparable to the background sound level derived from the LT survey discussed above, confirming that the LT background sound level data can be considered as representative for the area in general.



4.0 Potential Noise due to the Proposal

Car Park

- 4.1 From the transport data provided, it is understood that worst case additional hourly trips of 40 per hour (two way) would be expected. Our analysis has shown that the additional noise from these trips (assuming a low-speed movement of 10 km/h) would be around 36 dB L_{Aeq} at a distance of around 15 m (representative of the nearest garden).
- 4.2 From the baseline ambient data (see Table 3), a weekday noise level of 47 dB L_{Aeq} can be expected. The estimated additional vehicle noise of 36 dB is 11 dB below the measured weekday ambient, therefore, these additions are not expected to result in a significant change.

Plant Noise

- 4.3 Noise from the current mechanical extraction unit is continuous and steady in nature. Whilst at the ST1 measurement position its mechanical noise character could be distinguished, at ST2, noise from the kitchen extract fan when operating at full capacity was barely audible. Given that the distance of the extract fan to the nearby residential properties is even larger when compared to the ST2 position, its noise can be expected to be even lower.
- 4.4 Using the measured noise level at ST1 of 48 dB L_{Aeq} and assuming point source propagation loss ($20\log(3/41)$), calculations show a specific sound level of around 25 dB L_{Aeq} within a central position in the nearest residential garden (Darnley Cottage) can be expected. As no character corrections are necessary (character not distinguishable) the specific sound level is equivalent to the 'noise rating level'.
- 4.5 As discussed previously, a representative background sound level of 37 dB L_{A90} has been determined for the area through the long term baseline noise survey.
- 4.6 When comparing the 25 dB noise rating level against underlying conditions, it can be seen that the plant noise rating level is around 12 dB below the background sound level, confirming the on-site observation in terms of inaudibility and also demonstrating that current operational plant noise is unlikely to have an effect on amenity when assessed in accordance with BS 4142:2014 methodology.



- 4.7 Moreover, it is proposed that the extractor fan is to be retained but relocated to the waste/services area. Therefore, its noise reaching the nearby dwellings would most likely reduce when compared to existing conditions, due to increased distance and (partial) screening. As such, noise from the kitchen extraction is not expected to become problematic.
- 4.8 These calculations also show that, in the event new or additional plant is required, there is scope for such plant to be included whilst remaining compliant with typical Gravesham noise limits, i.e. 10 dB below the prevailing 37 dB L_{A90} background sound level.
- 4.9 However, it worth mentioning that a noise level limit of around 27 dB is very low, particularly when compared to mid-40s dB ambient noise conditions, and arguably the magnitude of the noise level in question rather than the rating level is a better indicator for assessing potential for plant noise nuisance.

Patron Noise

Pub Garden

- 4.10 Patron noise associated with the pub garden mainly occurs during warmer periods of the year. At the time of undertaking this assessment, the pub garden was not in use, meaning that no quantitative comparison can be drawn.
- 4.11 Nevertheless, it is understood that despite the proposed rearrangement of the pub garden, overall capacity of the garden will not change. It is therefore expected that patron noise from proposed future pub garden use, assuming similar number of patrons, would be very similar (if not the same) to what is currently permitted.

Additional Indoor Noise (Break-out)

- 4.12 Restaurants can become quite noisy spaces during busy times, especially where no consideration has been given to the acoustics as part of the interior design, i.e. only acoustically hard surfaces included. This is due to the 'Lombard Effect' where, in simplistic terms, a vicious circle is created where patrons have to raise their voice to be intelligible resulting in more noise resulting in patrons raising their voice even more.
- 4.13 At this stage of the proposal, no details regarding internal surface finishes are available, making it difficult for internal patron noise to be estimated. However, if a conservative



internal reverberant noise level of 90 dB(A) is taken, the noise contribution at the nearest dwelling can be estimated. Glazing, which is typically the weakest element of a building fabric, is expected to provide at least 30 dB reduction. Distance and screening would further reduce noise by around 35 dB and 10 dB respectively, with the resulting patron noise egressing from the rear extension being roughly 15 dB when the doors of the extension are shut, which would be virtually inaudible.

- 4.14 With the doors of the proposed extension open, the attenuation of the glazing/doors would no longer apply, however, a significant 'amount' of sound absorption is introduced thus likely to prevent the 'Lombard Effect' occurring with significantly lower indoor noise levels as a result.
- 4.15 Our calculations show that internal noise levels may vary between 71 and 83 dBA with a full restaurant and one person per table talking at any point for normal and loud speech respectively.
- 4.16 Building on the above, assuming raised vocal effort rather than normal with open doors (worst case) and taking into account propagation attenuation, noise levels at the nearest garden can be expected to be around 33 dBA. This is well below the ambient noise for the area of 47 dBA, as such, worst case noise contribution from the proposed extension is not expected to be significant.

Other Noise

- 4.17 Bins, including those for glass recycling, are currently situated within the car park with a direct line of sight the neighbouring dwellings. Noise from depositing waste would therefore travel uninhibitedly to these dwellings.
- 4.18 As part of the proposal, a dedicated fenced-off bin/service area to the rear of the restaurant is included. Any future noise from depositing waste in the bins would therefore likely be screened resulting in a betterment when compared to existing conditions.



5.0 Acoustic Design Recommendations

Plant Noise Limits

- 5.1 In the event that plans change and new and/or altered plant are to be introduced as part of the proposed development, the overall plant noise rating level is recommended to be limited to 27 dB(A), i.e. 10 dB below the prevailing background sound level, at the nearest dwelling (central garden position) when assessed in accordance with BS 4142:2014 methodology.
- 5.2 As discussed previously, there may be scope for relaxing the above noise limit due to both the likelihood of background creep being low (e.g. a limit of 5 dB below or not to exceed the background sound level could be suitable) and the noise level limits being so low that the magnitude rather than the rating may be a better indication of the noise's effect. However, it is recommended any deviation from Gravesham Borough Council's standard approach to limiting plant noise is first confirmed with them.

Internal Acoustics

- 5.3 As indicated earlier in this report, with an acoustically inadequate design, internal noise conditions within the restaurant can spiral out of control during busy trading hours (due to the Lombard Effect) thereby adversely affecting speech intelligibility and patrons' ability to comfortably converse across a table, ultimately resulting in unpleasant conditions and a reduction in the quality of the dining experience.
- 5.4 Such a problem can, however, be minimised or prevented through inclusion of suitable acoustic absorptive finishes as part of the interior design. It is therefore recommended this aspect is taken into account as part of the more detailed stages of the design.



6.0 Summary and Conclusions

- 6.1 This report has presented the findings of a Noise Assessment relating to the proposed redevelopment/extension at The Golden Lion pub/restaurant. The assessment identified key sources of noise, quantified prevailing and source noise through monitoring. Using these data and consideration of the proposal, the potential for future noise effects have been assessed, against Local and British guidance where applicable.
- 6.2 Assessment of prevailing environmental noise levels has been undertaken over what is deemed to have been a typical period, including a weekend. The prevailing noise environment was observed as being tranquil, as expected for such a rural location.
- 6.3 It is understood that existing noisy plant will be retained and relocated to the proposed services area. Assessment of the operational plant noise in line with BS 4142:2014 guidance has shown that the noise rating level would remain more than 10 dB below the prevailing background sound conditions, likely improving when compared to current conditions. Should it be required, a recommended noise level limit for new and/or altered plant is provided in this report.
- 6.4 Outdoor patron noise from the pub garden has been considered on a qualitative basis comparing future conditions against the current situation. Whilst rearrangement of the pub garden is proposed, overall capacity of the garden will not change, thus patron noise is expected to be very similar (if not the same) as what is currently permitted.
- 6.5 The assessment has also shown that indoor patron noise associated with the rear extension is unlikely to be audible at nearby dwellings. However, high level recommendations have been made for internal acoustics to be considered as part of the more detailed stages of the design, should planning consent be given, to ensure indoor levels remain relatively low and dining experience is not adversely affected by noise.



APPENDIX A: Acoustic Terminology

Parameter	Description
Sound	A sound wave can be viewed as small pressure fluctuations in an elastic medium such as air. When the frequencies of the pressure fluctuations are within the audible range, the human ear responds to sound waves which produces the sensation of hearing. There are two basic characteristics of sound: amplitude and frequency. Amplitude relates to the perceived loudness of a sound whereas the pitch of a sound corresponds to the frequency.
Noise	Noise, a subjective term, is essentially unwanted sound . It is very much dependent on the receptor's perception of the sound.
Decibel (dB)	The sound pressure is measured in Pascals. The human ear responds to a wide range of sound pressures, from 0.00002 to 20 Pascals. Given this wide range of values, it is convenient to express these in a logarithmic scale, the decibel (dB). The decibel is a logarithmic scale representing the measurement unit of sound pressure levels or noise levels relative to the threshold of hearing (20×10^{-6} Pascals). Zero decibel represents the threshold of hearing. The higher the value the louder the sound, with the value around 110 decibel being the level at which hearing becomes uncomfortable. Around 130 decibel is the threshold of pain at which hearing becomes painful.
Frequency (Hz)	The pitch of a sound relates to the frequency, which is expressed in Hertz (Hz). The audible range for human hearing typically ranges from 20 Hz to 20 kHz, but this tends to decrease with age. A pure tone, e.g. as produced by a tuning fork, contains sound of a single frequency (440 Hz). In real life, most sound consists of complex waves containing sound waves of multiple frequencies.
A-weighting	Human hearing is not linear, i.e. the perceived loudness of sound varies with both frequency and amplitude. To better represent the human hearing response, frequency 'weightings' are applied to sound. There are various weighting networks best suited to specific conditions. However, in practice, the A-weighting network has become the generally accepted 'correction' for representing loudness. When a weighting filter has been applied to a value, the weighting type is added to the descriptor, L_{Aeq}, L_{pA}, etc, or just after the decibel, dBA or dB(A)

Parameter	Description
Octave Bands or 1/3-Octave Bands	Whilst single figure values are useful, often spectral data is required for analysis and/or acoustic specification. To represent the frequency content, sound level or acoustic properties are presented in specific frequency bands, also known as octave bands. The frequencies of octave bands have been internationally standardised. For example, the 500 Hz octave band (500 Hz being the centre frequency) has a range from 354 Hz to 707 Hz. Where finer spectral detail is required, 1/3-octave band data can be used. Each octave band is divided into three 1/3-octave bands.
Sound Pressure Level (SPL or L_p)	The sound pressure level is indicative of the sound wave strength and has good correlation with perceived loudness. Sound pressure is expressed in Pascals and, for convenience, is expressed
Sound Power Level (SWL or L_w)	The sound power is the overall acoustic energy radiated by a source over a specific period and is expressed in Watts. It is an inherent property of the source and, unlike sound pressure, does not depend on the distance to the source. As sound power values vary greatly, it is convenient to express these as a level in decibels, the sound power level, SWL or L_w (referenced to 10^{-12} Watts).
$L_{Aeq,T}$	The A-weighted equivalent continuous sound level over the period T. Often also referred to as the ambient noise level. This is the sound level that is equivalent to the total average energy of noise recorded over a given period.
L_{Amax}	The A-weighted maximum instantaneous noise level.
L_{A10}	The A-weighted statistical sound level which is exceeded 10% of the given measurement period. In the UK, this level is usually used to describe road traffic noise .
L_{A90}	The A-weighted statistical sound level which is exceeded 90% of the given measurement period. This level is usually synonymous with the background sound level and generally describes the underlying level of sound that is experienced when specific events are not taking place.
R_w	The weighted (w) sound reduction index (R), a single figure rating of the laboratory airborne sound insulation performance of a construction, usually measured across the frequency range 100-3150Hz. The higher the value, the greater the sound insulation, and the more onerous the requirement.

Parameter	Description
$D_{nT,w}$	The weighted (w) sound insulation (D), a single figure rating of the in-situ airborne sound insulation performance of a construction. The sound insulation value is standardised (nT) to a reference reverberation time for typical conditions. The higher the value, the greater the sound insulation.
$L'_{nT,w}$	The weighted (w) impact sound pressure level (L), a single figure rating of the in-situ impact sound insulation performance of a construction. The sound insulation value is standardised (nT) to a reference reverberation time for typical conditions. The lower the value, the greater the sound insulation.
C or C_{tr}	These are spectrum adaptation terms for taking into account the effect of different sound spectra. C and C_{tr} are corrections for pink noise and traffic noise respectively and are added to single figure quantities, e.g. $R_w + C_{tr}$
$D_{n,ew}$	The weighted (w) element (e) normalised (n) level difference (D), an indicator of the ability of a small building element (such as a trickle ventilator) to reduce sound in a particular frequency band. The higher the value, the greater the sound reduction, and vice versa.
Reverberation Time (RT60 or T60)	Reverberation time relates to the echoing decay of sound in a room. More specifically, the reverberation time (RT60) is the time it takes for the sound pressure level to drop by 60 dB after excitation. The value is expressed in seconds. In many situations, conditions do not allow for the entire 60 dB decay time to be measured. Where this is the case, a reduced part of the decay can be measured and the results extrapolated; typically these are the T20 or T30. The higher the value, the more reverberant a space is.



APPENDIX B: Planning Policy and Guidance

NATIONAL PLANNING POLICY FRAMEWORK, 2023 (NPPF)

The National Planning Policy Framework (NPPF) includes the following statements relating to noise and the requirement to take it into account in the planning process.

Section 15, paragraph 180 (e) of NPPF states:

- *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.*

Section 15, paragraph 191 of NPPF states:

- *(a) mitigate and reduce to a minimum potential adverse impact 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 193 of NPPF further elaborates on the consideration of existing businesses, as follows:

- *Planning policies and decisions should ensure that new development can be integrated effectively with existing businesses and community facilities (such as places of worship, pubs, unreasonable restrictions placed on them as a result of development permitted after they were established. Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or 'agent of change') should be required to provide suitable mitigation before the development has been completed.*

The NPPF does not provide absolute limits on noise that are acceptable or unacceptable in a given situation. It does, however, set out the “need to ensure that developments do not give rise to significant adverse impacts on health and the quality of life”. In addition, the operations of existing businesses are also protected, with reference to ensuring new developments do not have an adverse effect on their operations.

NOISE POLICY STATEMENT FOR ENGLAND, 2010 (NPSE)

The Noise Policy Statement for England (NPSE) applies to all forms of noise including environmental noise, neighbour noise and neighbourhood noise but does not apply to noise in the workplace. The Government recognizes that the effective management of noise requires a coordinated and long-term approach that encompasses many aspects of modern society.

The long-term vision of Government noise policy is set out to promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development. This long-term vision is supported by three aims:

- ▶ 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 NPSE introduces the concept of NOEL, LOAEL and SOAELs, which are described below:

- ▶ NOEL – No Observed Effect Level – This is the level below which no observable effect can be detected.
- ▶ LOAEL – Lowest Observed Adverse Effect Level – This is the level above which adverse effects on health and quality of life can be detected.
- ▶ SOAEL – Significant Observed Adverse Effect Level – This is the level above which significant effects on health and quality of life can be detected.

PLANNING POLICY GUIDANCE – NOISE, 2014

This guidance is provided online within the UK Government Planning System. The guidance expands upon the concepts of Observed Effect Levels and the following table is provided.

Planning Policy Guidance - Noise exposure hierarchy

Perception	Examples of Outcomes	Increasing Effect Level	Outcome
No Observed Effect Level			
Not Noticeable	No Effect	No Observable Effect	No specific measures required
Noticeable but not Intrusive	Noise can be heard but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area, but not such that there is a perceived 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 and/or attitude, 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 perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level			
Noticeable and disruptive	The noise causes a material change in behaviour and/or attitude, 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
Noticeable and very disruptive	Extensive and regular changes in behaviour and/or an inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory	Unacceptable Adverse Effect	Prevent

ProPG: PLANNING & NOISE PROFESSIONAL PRACTICE GUIDANCE ON PLANNING & NOISE NEW RESIDENTIAL DEVELOPMENT MAY 2017

The primary goal of ProPG is to assist the delivery of sustainable development by promoting good health and wellbeing through the effective management of noise. It seeks to do that through encouraging a good acoustic design process in and around proposed new residential development having regard to national policy on planning and noise.

ProPG advocates a systematic, proportionate, risk based, 2-stage, approach. The approach encourages early consideration of noise issues, facilitates straightforward accelerated decision making for lower risk sites, and assists proper consideration of noise issues where the acoustic environment is challenging. It is envisaged that following the guidance contained in this document will increase the likelihood of success of planning applications for new residential development, yet it also provides a clear basis for recommending refusal of new housing development on noise grounds where necessary.

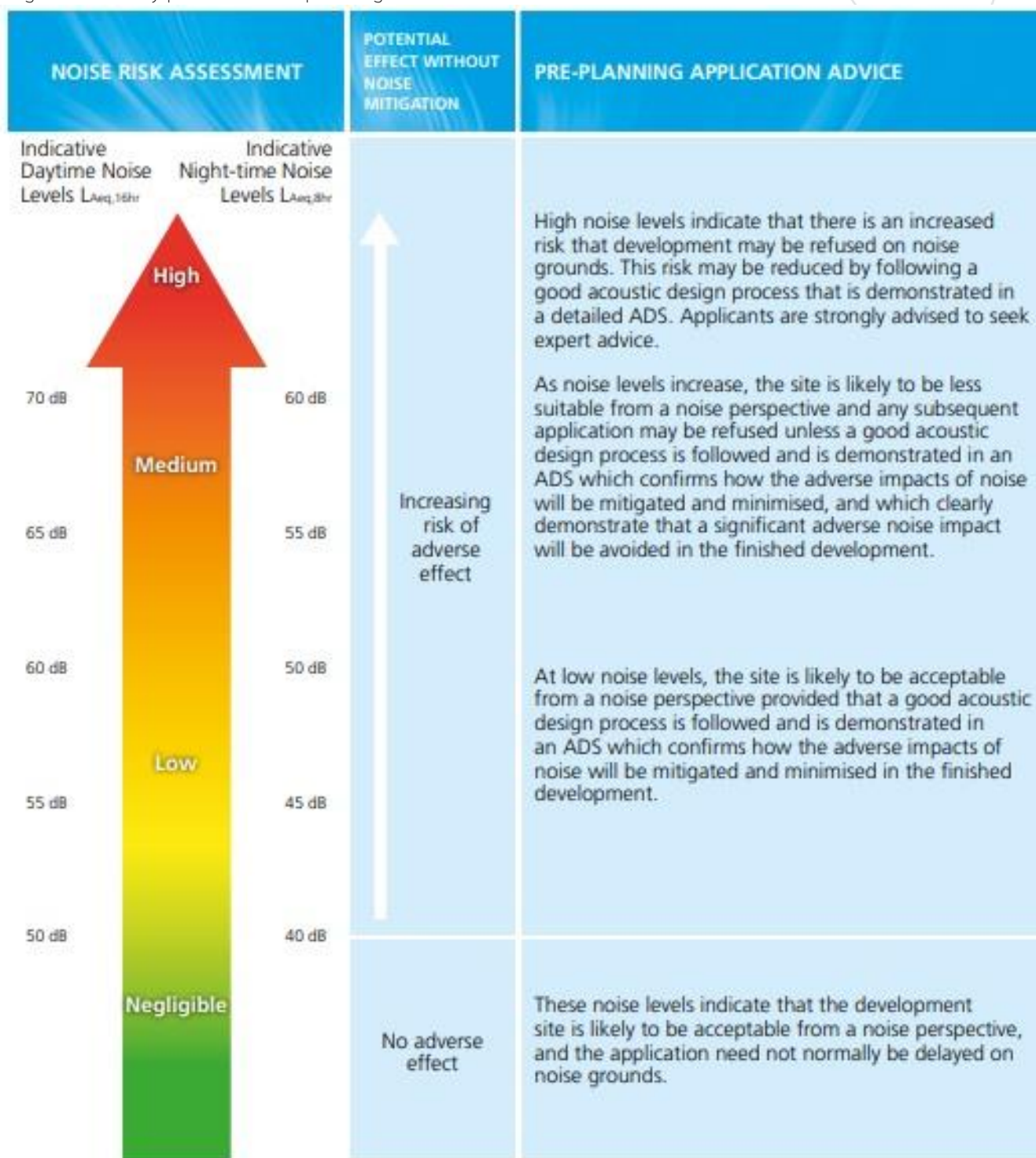
Stage 1: Initial Site Noise Risk Assessment

An initial noise risk assessment of the proposed development site should be conducted by a competent noise practitioner at the earliest opportunity, before any planning application is submitted. The noise risk assessment should provide an indication of the likely risk of adverse effects from noise were no subsequent mitigation to be included as part of the development proposal. It should indicate whether the proposed site is considered to pose a negligible, low, medium or high risk from a noise perspective.

Stage 2: Full Assessment – the four key elements

- ▶ Element 1 – Good Acoustic Design Process Stage 2:
- ▶ Element 2 – Internal Noise Level Guidelines Stage 2:
- ▶ Element 3 – External Amenity Area Noise Assessment Stage 2:
- ▶ Element 4 – Assessment of Other Relevant Issues

Figure: Summary plan for ProPG planning advice



The following British Standards and Building Regulations have been considered for this assessment.

BS 8233:2014 'Guidance on sound insulation and noise reduction for buildings'

This standard provides information and guidance on sound insulation and noise reduction for buildings. It deals with the control of external noise and outlines recommendations for occupied rooms.

The following table is taken from the document outlining requirements for internal noise levels in residential accommodation.

Indoor Ambient Noise Levels for Dwellings (BS 8233:2014)

Activity	Location	07:00 to 23:00	23:00 to 07:00
Resting	Living Room	35dB $L_{Aeq,16Hr}$	-
Dining	Dining Room/Area	40dB $L_{Aeq,16Hr}$	-
Sleeping	Bedroom	35dB $L_{Aeq,16Hr}$	30dB $L_{Aeq,8Hr}$

The noise levels presented are based on existing WHO guideline values. The document further recommends that guideline value may be set in terms of SEL or $L_{Amax,F}$, if systematic individual noise events are happening. The values are depending on the character and number of events per night. Sporadic noise events could require separate values. In this instance a target value of 45 dB L_{Amax} has been established as the average L_{Amax} level not to be exceeded in bedrooms at night.

External Amenity Space

BS 8233:2014 offers the following guidance regarding outdoor amenity space:

"For traditional external areas that are used for amenity space, such as gardens and patios, it is desirable that the external noise level does not exceed 50dB LAeq, with an upper guideline value of 55dB LAeq which would be acceptable in noisier environments. However, it is also recognised that these values are not achievable in all circumstances where development might be desirable. In higher noise areas, such as city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces but should not be prohibited."

BS 4142: 2014 'Methods for rating and assessing industrial and commercial sound'

BS 4142:2014 describes methods for determining and assessing noise levels from noise sources with a view to determining the likelihood of adverse impact.

The document has been developed for the purposes of:

- ▶ Investigating complaints,
- ▶ Assessing sound from proposed new, modified or additional sources of sound of an industrial and / or commercial nature; and
- ▶ Assessing sound at proposed new dwellings or premises used for residential purposes.

The document is now suitable for the determination of noise nuisance. Furthermore, that standard is not intended to apply to the following sources of noise:

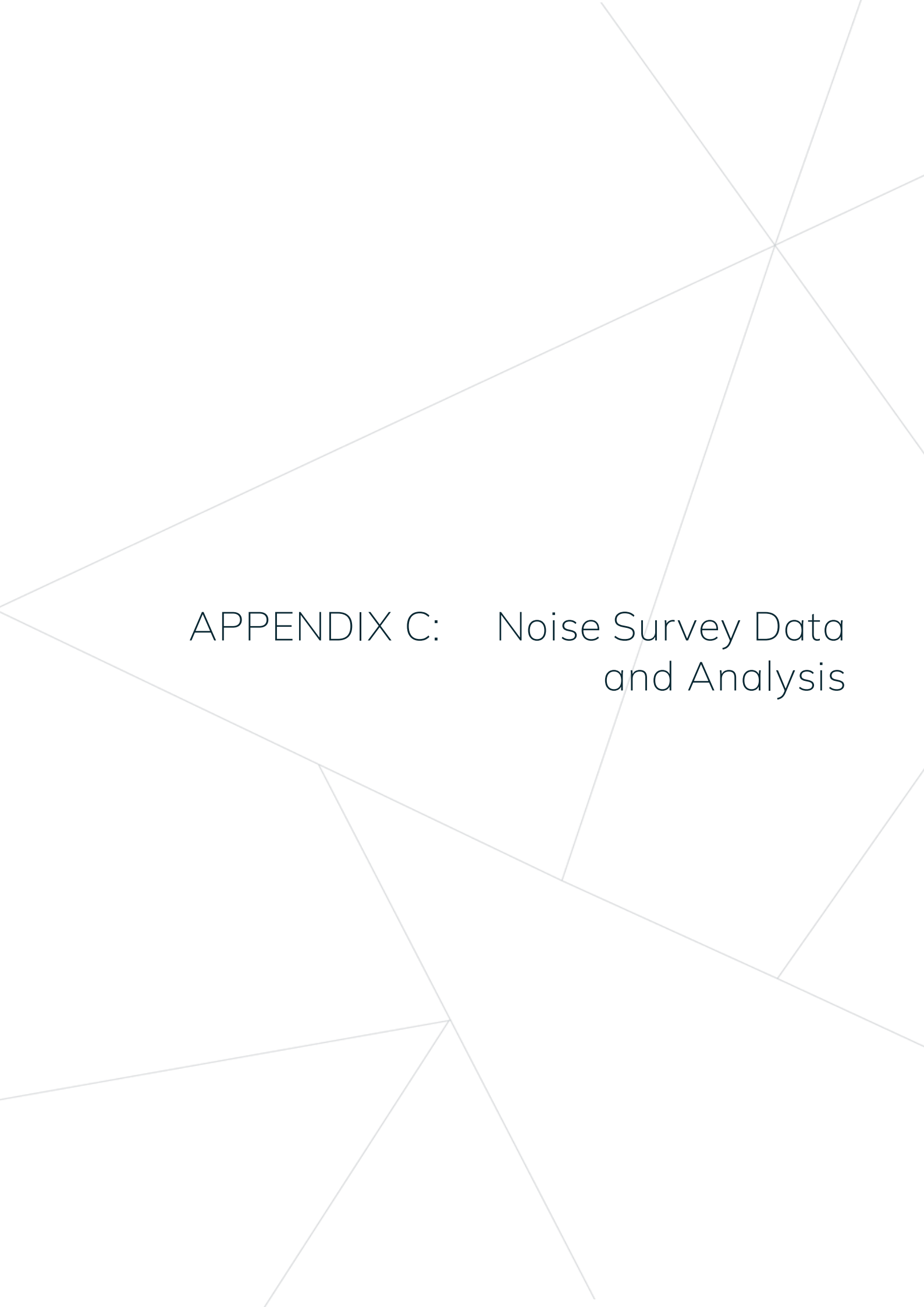
- ▶ recreational activities, including all forms of motorsport;
- ▶ music or other entertainment;
- ▶ shooting grounds;
- ▶ construction and demolition;
- ▶ domestic animals;
- ▶ people;
- ▶ public address systems for speech;
- ▶ other sources falling within the scopes of other standards or guidance.

The methodology requires the determination of the specific sound level, corrected for characteristic feature in order to produce a rating level. The rating level is then compared against the background noise level (expressed as $L_{A90,T}$), thereby producing an 'excess of Rating over background sound level' figure. This figure is then used for assessment of likelihood of adverse impact.

The standard places great emphasis on the context of the sound environment that is being assessed and the development overall. This is an essential part of the assessment process, particularly when predicting likelihood of adverse impact. However, for guidance the following is included in the standard:

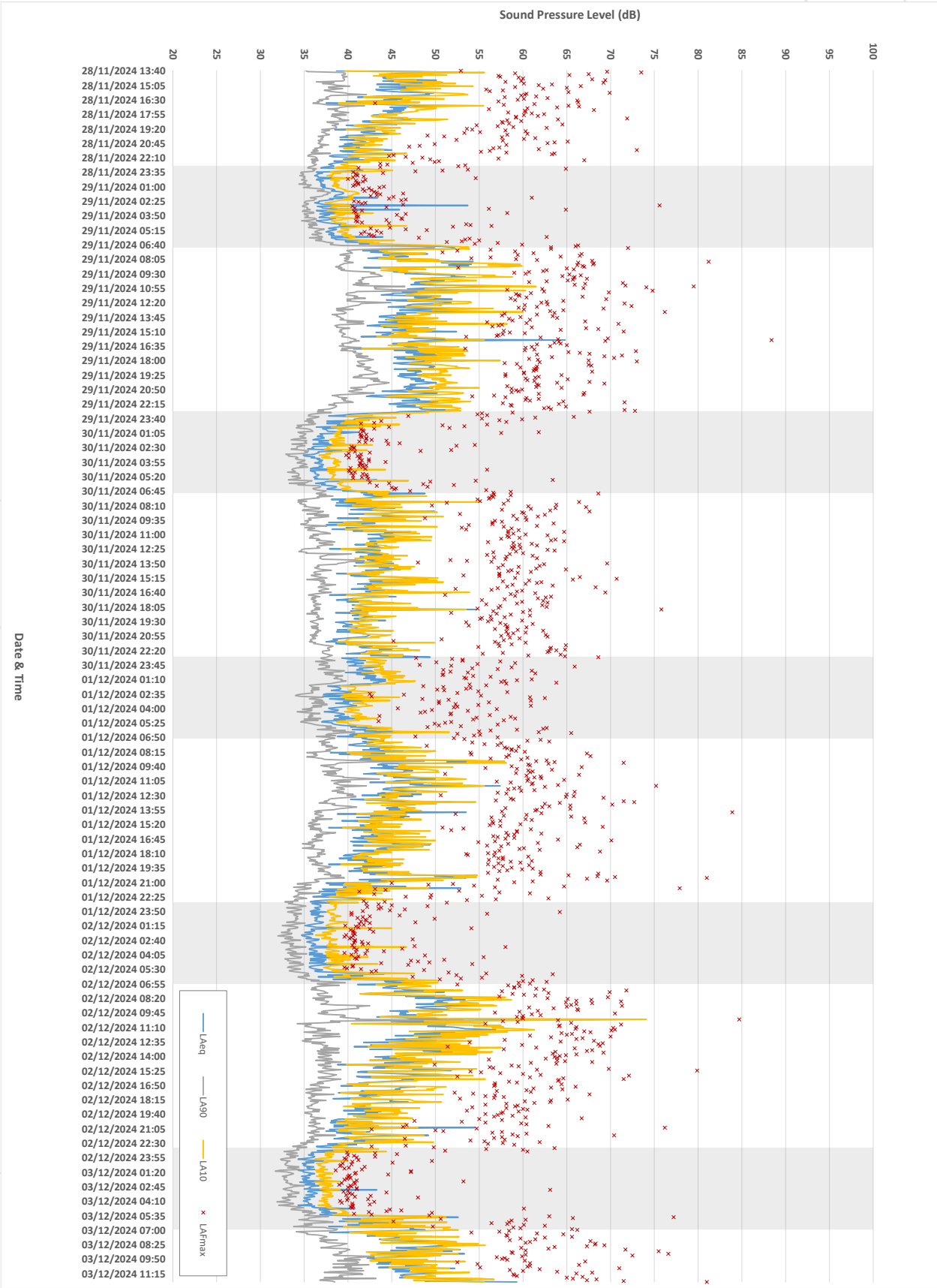
- ▶ Typically, the greater the difference, the greater the magnitude of the impact;
- ▶ A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context;

- ▶ A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context; and
- ▶ The lower the rating 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. When 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.



APPENDIX C: Noise Survey Data and Analysis

Long Term Noise Survey (LT)



Short Term Attended Noise Survey

ST1 – 3 m from Plant

Location	Date	Duration	LAeq	LAFmax	LAF,10	LAF,90
ST1	(2024/11/28 12:18:28.00)	(0:0:21.0)	48	49	49	48

ST2 – 32 m from Plant

Location	Date	Duration	LAeq	LAFmax	LAF,10	LAF,90
ST2	(2024/11/28 12:26:01.00)	(0:3:58.0)	42	63	43	37
	(2024/11/28 12:30:01.00)	(0:4:58.0)	51	72	55	36
	(2024/11/28 12:35:01.00)	(0:4:58.0)	51	66	54	36
	(2024/11/28 12:40:02.00)	(0:4:57.0)	58	75	57	36
	(2024/11/28 12:45:01.00)	(0:4:58.0)	52	69	49	35
	(2024/11/28 12:50:02.00)	(0:4:57.0)	49	66	54	36
	(2024/11/28 12:55:02.00)	(0:4:57.0)	50	68	49	37
	(2024/11/28 13:00:02.00)	(0:4:57.0)	52	75	55	35
	(2024/11/28 13:05:01.00)	(0:4:58.0)	49	67	52	34
	(2024/11/28 13:10:01.00)	(0:4:58.0)	48	65	48	33
	(2024/11/28 13:15:02.00)	(0:4:57.0)	55	75	51	36
	(2024/11/28 13:20:02.00)	(0:4:57.0)	57	74	61	35
	LAeq [1]		53	LA10 [3]		52
	LAFmax [2]		69	LA90 [*]		36

[1] Logarithmic average, [2] Arithmetic average of the 5-minute values, [3] Arithmetic average of the 10th highest values, [*] Values representative of the prevailing background sound levels where the LA90 value of 36 is the mode of ST2's data set.



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