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Dunsbury Hill Farm – Plot 3b

Noise Impact Assessment

On behalf of **Portsmouth City Council**

Project Ref: 43530/3001 | Rev: AA | Date: April 2019

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Contents

1	Introduction	1
1.2	Site Location	1
1.3	Scope of Assessment.....	2
1.4	Acoustic Terminology	2
2	Planning Policy, Standards and Guidance	3
2.1	Background	3
2.2	National Policy	3
2.3	Relevant Industry Standards	5
3	Baseline Environmental Sound Survey	7
3.1	Methodology	7
4	BS4142:2014 Assessment.....	8
4.1	Purpose of Assessment	8
4.2	Noise Sensitive Receptors	8
4.3	Proposed Site Layout	8
4.4	Assessment Assumptions	8
4.5	Calculation Procedure	8
4.6	Acoustic Feature Correction.....	10
4.7	Preliminary Assessment Results	10
4.8	Context and Mitigating Factors.....	10
4.9	Uncertainty	11
4.10	Assessment Summary	12
5	Conclusion	13

Figures

Figure 1: Indicate Site Boundary and Nearest Noise Sensitive Receptors (Contains OS data © Crown Copyright and database right 2017)	1
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Tables

Table 3.1 Typical Background Sound Levels at Nearest Noise Sensitive Receptors	7
Table 4.1: Octave Band Sound Pressure Levels at 1 m from Proposed Conveyor System	9
Table 4.2: Assumed Sound Reduction Performances of Cladding System	9
Table 4.3: BS4142:2014 Preliminary Assessment Results.....	10

Appendices

Appendix A	Acoustic Terminology
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1 Introduction

- 1.1.1 Peter Brett Associates LLP (PBA, now part of Stantec) has been commissioned by Portsmouth City Council to provide a noise impact assessment in order to support a reserved matters application for Plot 3b of a proposed commercial development implementing a conveyor system associated with distribution at Dunsbury Hill Farm in Havant.
- 1.1.2 This report assesses the potential noise impact on nearby noise sensitive receptors due to the operation of the proposed conveyor system associated with Plot 3b.
- 1.1.3 An environmental sound survey has previously been undertaken at the site by PBA in September 2015. The results of the survey have been used to inform the assessment.

1.2 Site Location

- 1.2.1 Plot 3b is located approximately 400 m to the east of the A3 (M) junction 3.
- 1.2.2 The nearest noise sensitive receptors are located along Calshot Road, approximately 100 m to the northeast of the proposed site, and along Shepherd Way, approximately 90 m to the east of the proposed site.
- 1.2.3 An indicative site boundary and the nearest noise sensitive receptors are presented in **Figure 1** below.

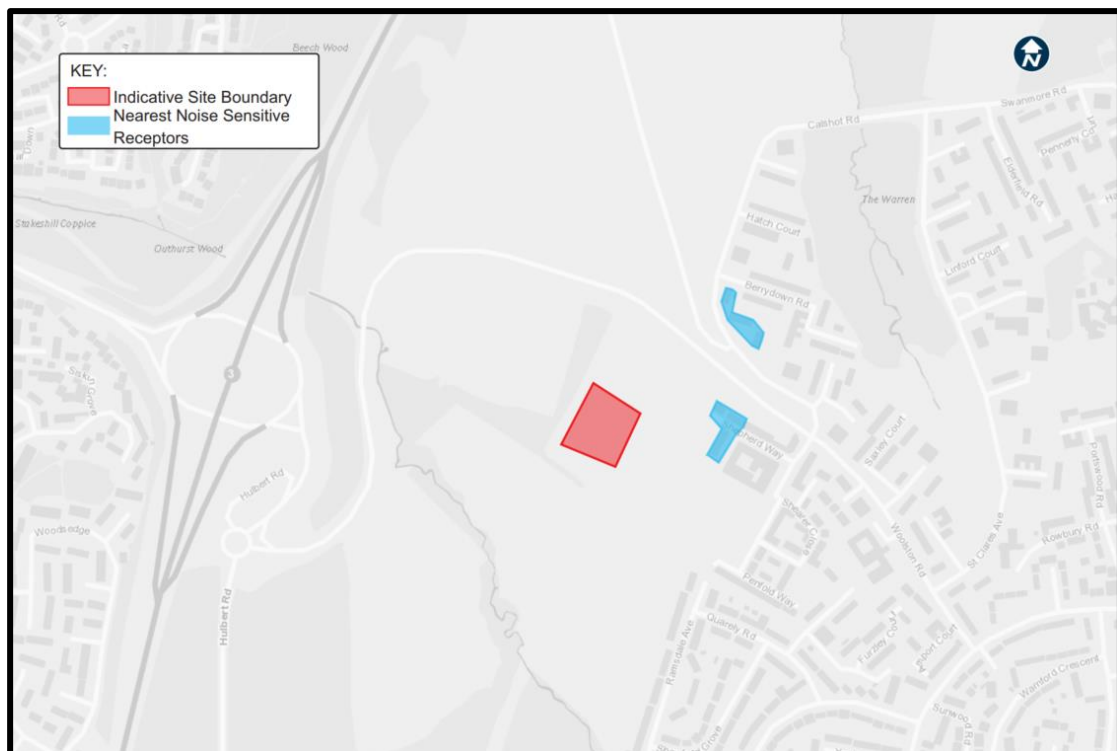


Figure 1: Indicate Site Boundary and Nearest Noise Sensitive Receptors (Contains OS data © Crown Copyright and database right 2017)

1.3 Scope of Assessment

1.3.1 The scope of the noise impact assessment is as follows:

- To present the results of the environmental sound survey undertaken by PBA in September 2015; and
- To undertake a noise impact assessment associated with the operation of the proposed development in accordance with BS4142:2014;

1.4 Acoustic Terminology

1.4.1 An explanation of the terminology used in this report is contained in **Appendix A**.

2 Planning Policy, Standards and Guidance

2.1 Background

- 2.1.1 It was previously agreed with Havant Borough Council in 2015 that the background sound levels as determined with the noise assessment undertaken for Plot 2, would serve as a baseline for each future plot development.
- 2.1.2 Due to the nature of the site, i.e within close proximity to a major round network link, it is unlikely that a significant change in noise climate has occurred in the surrounding area. Based on this, it is considered that the results of the survey undertaken in 2015 are representative of the existing environmental sound climate at the site.
- 2.1.3 Prior to occupation, as part of the Reserved Matters approval, Havant Borough Council require the following for the B8 use:

“The development hereby permitted shall not be occupied for B2 or B8 use until a scheme for insulating the building against internally generated noise has been implemented in accordance with details to be submitted to and approved in writing by the Local Planning Authority. All works forming part of such approved noise insulation scheme shall thereafter be retained. Reason: To safeguard the amenities of other premises nearby and having due regard to policies CS16 and DM10 of the Havant Borough Local Plan (Core Strategy) 2011, policy DM18 of the Havant Borough Publication Local Plan (Allocations) and the National Planning Policy Framework 2018.”

2.2 National Policy

The National Planning Policy Framework (NPPF)

- 2.2.1 The revised NPPF was published in July 2018. With respect to noise, Paragraph 170 states that:

“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. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans”.

- 2.2.2 Paragraph 180 of the NPPF states that:

“Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on

health and living conditions, as well as the potential sensitivity of 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 quality of life;*
- b) Identify and protect tranquil areas which may have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.”*

2.2.3 The NPPF goes on to advise, in Paragraph 182, that:

“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, music venues and sports clubs). Existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established. Where 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”.

Noise Policy Statement for England (NPSE)

2.2.4 The NPSE seeks to clarify the underlying principles and aims in existing policy documents, legislation and guidance that relate to noise. It also sets out the long-term vision of Government noise policy in Paragraph 1.6:

“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.”

2.2.5 The NPSE clarifies that noise should not be considered in isolation of the wider benefits of a scheme or development, and that the intention is to minimise noise and noise effects as far as is reasonably practicable having regard to the underlying principles of sustainable development.

2.2.6 The first two aims of the NPSE (Paragraph 2.20) follow established concepts from toxicology that are applied to noise impacts, for example, by the World Health Organisation. They are:

- NOEL – No Observed Effect Level is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise; and
- LOAEL – Lowest Observed Adverse Effect Level is the level above which adverse effects on health and quality of life can be detected.

2.2.7 The NPSE extends these to the concept of a significant observed adverse effect level (Paragraph 2.21):

- SOAEL – Significant Observed Adverse Effect Level is the level above which significant adverse effects on health and quality of life occur.

2.2.8 The NPSE notes in Paragraph 2.22:

“It is not possible to have a single objective noise-based measure that defines SOAEL that is applicable to all sources of noise in all situations. Consequently, the SOAEL is likely to be different for different noise sources, for different receptors and at different times”.

2.3 Relevant Industry Standards

BS4142:2014 Methods for rating and assessing industrial and commercial sound

- 2.3.1 BS4142: 2014 '*Methods for rating and assessing industrial and commercial sound*' (BS4142) describes methods for rating and assessing sound of an industrial and/or commercial nature. The methods described in the standard use outdoor sound levels to assess the likely effects of sound on people who might be inside or outside a dwelling or premises used for residential purposes upon which sound is incident.
- 2.3.2 The standard is used to determine the rating levels for sources of sound of an industrial and/or commercial nature and the ambient, background and residual sound levels at outdoor locations. These levels could be used for the purposes of investigating complaints; assessing sound from proposed, new, modified or additional source(s) of sound of an industrial and/or commercial nature; and assessing sound at proposed new dwellings or premises used for residential purposes. However, the determination of noise amounting to a nuisance is beyond the scope of the standard.
- 2.3.3 The standard should not be used to assess sound from the passage of vehicles on public roads and railway systems; recreational activities; music and other entertainment; shooting grounds; construction and demolition; domestic animals; people; public address systems for speech and other sources falling within the scopes of other standards or guidance. The standard cannot be applied to the derivation of indoor sound levels arising from sound levels outside, or the assessment of indoor sound levels.
- 2.3.4 The procedure contained in BS4142 assesses the significance of sound which depends upon the margin by which the rating level of the specific sound sources exceeds the background sound level and the context in which the sound occurs/will occur.
- 2.3.5 An initial estimate of the impact of the specific sound is obtained by subtracting the measured background sound level from the rating level and considering the following:
- Typically, the greater this 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 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.
- 2.3.6 Where the initial estimate of the impact needs to be modified due to the context, the following factors should be considered:
- The absolute level of sound;
 - The character and level of the residual sound compared to the character and level of the specific sound; and
 - The sensitivity of the receptor and whether dwellings or other premises used for residential purposes will already incorporate design measures that secure good internal and/or outdoor acoustic conditions such as:

- Façade insulation treatment;
- Ventilation and/or cooling that will reduce the need to have windows open so as to provide rapid or purge ventilation; and
- Acoustic screening.

3 Baseline Environmental Sound Survey

3.1 Methodology

- 3.1.1 The environmental sound climate around the site was measured by PBA in 2015 as part of the planning application for Plot 2 (Planning Application Reference: APP/15/01156, Report Reference: Plot 2, Dunsbury Hill Farm Havant, Environmental Sound Survey and Plant Noise Impact Assessment project ref 35226 Rev1, dated 28 October 2015).
- 3.1.2 The environmental sound survey undertaken in 2015 forms the basis of this assessment. Full details of the sound survey can be found in the aforementioned report.
- 3.1.3 Based on the information contained within the report, it is understood that Fully automated environmental noise monitoring was undertaken from approximately 15:30pm Friday 4th September to approximately 12:00pm Tuesday 8th September 2015. Attended noise surveys were also undertaken on Friday 4th September 2015.
- 3.1.4 For the purpose of this assessment the results of the attended measurement position ST4 will be used.
- 3.1.5 The attended measurement position was undertaken approximately 5 m from the edge of Calshot road to the southeast of the site at a height of approximately 1.5 m.
- 3.1.6 Based on the environmental sound survey results, representative background sound levels have been derived and are detailed in **Table 3.1**.

Table 3.1 Typical Background Sound Levels at Nearest Noise Sensitive Receptors

Period	Typical Background Sound Level
	L _{A90,15min} , dB
Daytime (07:00 hours – 23:00 hours)	46
Night-time (23:00 hours – 07:00 hours)	34

4 BS4142:2014 Assessment

4.1 Purpose of Assessment

- 4.1.1 An assessment of the likely noise impact associated with the operation of proposed conveyor system has been undertaken in general accordance with BS4142:2014.

4.2 Noise Sensitive Receptors

- 4.2.1 The assessment has been undertaken at the nearest noise sensitive receptor to the proposed development, considered to be the residential dwellings located along Shepherd Way located approximately 90 m from the proposed site boundary.

4.3 Proposed Site Layout

- 4.3.1 The assessment has been based on the latest masterplan '00 – Ground Floor - GA Drawing Number 11051 rev P7 dated 01/23/2015' and on elevation plan 'West & East Elevations Drawing Number 18202 rev P2 dated 07/24/2018'.
- 4.3.2 Based on a review of the plans the warehouse building is located approximately 90 m from the nearest noise sensitive receptor.

4.4 Assessment Assumptions

- 4.4.1 The following has been assumed:
- The primary proposed operational times of the distribution centre are Monday – Saturday between 06:00 and 18:00 hours, with a reduced operation during the night time period;
 - The main building is to be constructed of a horizontally laid built-up wall cladding system with a lightweight, cladding style roof system;
 - The proposed conveyor system, whilst comprising multiple elements, will be assessed as one unit.

4.5 Calculation Procedure

- 4.5.1 Calculations have been undertaken of the likely noise levels at the nearest noise sensitive receptor associated with the operation of the site during a worst-case one-hour operation period during the daytime (07:00 – 18:00 hours) and during a worst-case 15-minute period during the night-time period (06:00 – 07:00 hours). Calculations assume that the conveyor system is in continuous operating for the duration of the assessment period. The reduced operation during the night time period is assumed to be of a lower impact than the operation of the site including the conveyor system. Due to this, noise impact associated with the reduced operation has not been assessed.
- 4.5.2 The proposed conveyor system is made up of a number of elements including belt conveyors and powered rollers.
- 4.5.3 The manufacturer (Caljan) of the conveyor system has stated that *"Noise levels around the system will be no greater than 72 dba without product on the system. This figure measured at 1 x 1 meter away from the conveyor."*
- 4.5.4 In our experience, it is not considered that the addition of product to the system will significantly increase noise levels.

- 4.5.5 In the absence of detailed octave band sound source levels, an octave band sound power spectrum from a similar item of plant (Steel Idler Roll Conveyor System) has been used to inform the assessment. **Table 4.1** details the octave band source sound levels associated with the operation of the conveyor system. For the purposes of the assessment the conveyor system has been assumed to emit a sound pressure level of 72 dBA when measured at 1m from any part of the system.

Table 4.1: Octave Band Sound Pressure Levels at 1 m from Proposed Conveyor System

Description	1/1 Octave Band Centre Frequency (Hz)							Sound Pressure Level dBA at 1 m from the Proposed Conveyor System
	63	125	250	500	1000	2000	4000	
Proposed Conveyor System	59	62	69	77	78	71	64	72

- 4.5.6 The calculations assume that the main building is to be constructed in a combination of composite & built-up insulated steel cladding, and curtain walling. Built-up insulated cladding is would be similar to Euroclad system incorporating 19/1000 liner sheet, 220mm Quattro brackets and Quattro bars, 220mm thick rockwool quilt and 50/1000 halfround HPS200 top sheet.
- 4.5.7 The roof covering would be similar to a Euroclad built-up system. Liner sheet is MW5, 300mm Quattro brackets and bars, 300mm Rockwool insulation quilt and Euroclad 32/1000 HPS200 Top Sheet. Approximately 10% of the roof area will comprise double glazing elements as been tested at this point..
- 4.5.8 Manufacturer's test data is not available for the proposed constructions. Test data for similar constructions has therefore been used in the assessment. **Table 4.2** details the assumed sound reduction performance values for each building element based on test data for similar systems.

Table 4.2: Assumed Sound Reduction Performances of Cladding System

Building Element	Description	Sound Reduction Index (R) at 1/1 Octave Band Centre Frequency (Hz)							R _w
		63	125	250	500	1000	2000	4000	
Wall	Lightweight cladding with mineral wool insulation and steel liner sheet	13	14	29	38	40	45	55	38
Roof	Lightweight cladding with mineral wool insulation and steel liner sheet	13	14	29	38	40	45	55	38
Rooflight	Conventional Double Glazing	24	24	20	25	34	37	37	30
Door	Roller door	8	10	13	14	15	15	15	15

4.6 Acoustic Feature Correction

- 4.6.1 Some sources can be considered to emit noise that is tonal. Impulsive or intermittent in nature. For these sources, corrections should be applied (maximum of +6 dB for tonality, +9 dB for impulsivity and +3 dB for intermittency).
- 4.6.2 Third octave band data for the proposed conveyor is not available however analysis of data for a similar system suggests that it is unlikely that the proposed conveyor system will exhibit tonal characteristics.
- 4.6.3 The operation of the conveyor system is not likely to be impulsive or intermittent. Acoustic feature corrections have therefore not been applied.

4.7 Preliminary Assessment Results

- 4.7.1 **Table 4.3** details the preliminary results of the BS4142:2014 assessment of the proposed development. The specific sound level has been calculated at ground floor height (1.5 metres) for the assessment of impact during the daytime and evening periods and at first floor height (4 metres) for the assessment of impact during the night-time period.

Table 4.3: BS4142:2014 Preliminary Assessment Results

Description	Operational Periods	
	Daytime (07:00 – 19:00 hours) T = 1 hour	Night-Time (06:00 – 07:00 hours) T = 15mins
Calculated Specific Sound Level at Receptor 1 (dB L _{Aeq,T})	25	25
Acoustic Feature Corrections (dB)	+0	+0
Calculated Rating Sound Level at Receptor 1 (dB L _{Ar,T})	25	25
Background Sound Level (dB L _{A90,15mins})	46	34
Excess of Rating over Background Sound Level (dB)	-19	-11
Assessment of Impact	Indication of a low impact, depending on the context	Indication of a low impact, depending on the context

4.8 Context and Mitigating Factors

- 4.8.1 The above assessment details the results of the initial numerical assessment of sound levels at the nearest noise sensitive receptor. It is important to recognise context in the assessment of the likely noise impact on the proposed development site arising from the operation of the proposed conveyor system.
- 4.8.2 The following factors should be taken into consideration:
- The absolute sound level;
 - The character and level of the residual and specific sound levels; and
 - The sensitivity of the receptor.

Absolute Sound Levels

- 4.8.3 The calculated specific sound level at the worst affected façade of existing noise sensitive receptors, falls below the relevant criteria in World Health Organisation and BS8233 guidelines with respect to noise levels in external amenity areas. In addition, it is lower than the residual sound levels.

Receptor Sensitivity

- 4.8.4 The assessment undertaken is considered to be a worst-case operating scenario, where the use of the conveyor system is continuous throughout the assessment period. The machine may be operational for less time than assumed. This would result in a lower rating sound level at the receptor.
- 4.8.5 Furthermore, as the background sound level used within the assessment is based on the typical level, the background sound level has the potential to be higher. This would reduce the potential noise impact associated with the proposed development at the receptor.

4.9 Uncertainty

- 4.9.1 Care has been taken to reduce uncertainty as far as reasonably possible. However, it should be recognised that in any environmental sound survey and assessment process uncertainty exists.

Measured Environmental Sound Levels

- 4.9.2 The assessment relies on the results of the previous environmental sound survey undertaken by PBA. Uncertainty in measured background sound levels can occur due to variation in temporary/non-representative meteorological conditions however steps were taken to minimise the risk of meteorological conditions affecting the survey results.

Calculation and Assessment Procedure

- 4.9.3 Uncertainty in the sound power levels used in the assessment can occur due to variations in the sound emissions of the source and the operating conditions under which the source is expected to operate.
- 4.9.4 Source data for the proposed conveyor system has been provided in terms of the broadband A-weighted sound pressure level at 1 m from the proposed conveyor system. It should be recognised that uncertainty exists in the calculation process in the absence of 1/3 octave band data. Due to this, a sound power spectrum has been used for a similar piece of plant equipment to inform the assessment.
- 4.9.5 The assessment undertaken has been based on typical operational hours and conditions provided to us. However, it should be recognised that there is a degree of uncertainty associated with the exact operating conditions if different from those assumed. Nevertheless, it is considered that the assessment undertaken is suitably robust in determining the likely noise impact of the proposed development.

4.10 Assessment Summary

- 4.10.1 The results of the preliminary assessment indicate that the level of impact associated with the operation of the proposed development during the daytime and night-time periods is likely to be an indication of having a low impact, depending on the context.
- 4.10.2 Considering the results of the assessment and the contextual and mitigating factors detailed above, the operation of the proposed facility should be considered acceptable.

5 Conclusion

- 5.1.1 Peter Brett Associates LLP (PBA (now part of Stantec)) has been commissioned to provide a noise impact assessment in order to support a reserved matters application for Plot 3b of a proposed commercial development at Dunsbury Hill Farm in Havant.
- 5.1.2 The environmental sound climate around the site was measured by PBA in 2015 as part of the planning application for Plot 2 (Planning Application Reference: APP/15/01156, Report Reference: Plot 2, Dunsbury Hill Farm Havant, Environmental Sound Survey and Plant Noise Impact Assessment project ref 35226 Rev1, dated 28 October 2015).
- 5.1.3 An assessment in general accordance with BS4142:2014 has been undertaken to determine the likely impact associated with the proposed conveyor system at the nearest noise sensitive receptors. Calculations indicate that the level of impact associated with the operation of the proposed development during the daytime and night-time periods is likely to be an indication of having a low impact, depending on the context.
- 5.1.4 Based on the results of the assessments undertaken the operation of the proposed facility should be considered acceptable if designed within the parameters assessed within this document.

Appendix A Acoustic Terminology

Parameter	Description
Acoustic Environment	Sound at the receiver from all sound sources as modified by the environment.
Ambient Sound	Totally encompassing sound in a given situation at a given time, usually composed of sound from many sources near and far. Comprises of the residual sound and the specific sound when present.
Ambient Sound Level ($L_A = L_{Aeq,T}$)	Equivalent continuous A-weighted sound pressure level of the totally encompassing sound in a given situation at a given time, usually from many sources near and far, at the assessment location over a given time interval, T.
A-Weighted Decibel (dBA)	A decibel level that has been corrected for the A-Weighting curve.
A-Weighting	Octave band and 1/3 octave band filters that correlate to the response of the human hearing system to sound pressure levels at different frequencies.
Background Sound Level ($L_{A90,T}$)	A-weighted sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given time interval, T, measured using a fast time-weighting and quoted to the nearest whole number of decibels.
Decibel (dB)	A logarithmic unit used to describe the ratio between the measured level and a reference level of 0 dB. The ratio can be sound pressure, intensity or power. The reference value for sound pressure is 20 μ Pa and for sound power is 1 ρ W.
Equivalent Continuous A-Weighted Sound Pressure Level ($L_{Aeq,T}$)	Value of the time-averaged A-weighted sound pressure level, in decibels (dB), of a continuous steady sound for the duration of the specified time interval, T.
Fast Time Weighted	The speed at which the instrument responds to changes in amplitude of the measured signal. The response time of a fast time-weighted instrument is 0.125 seconds.
Free-Field Level	The sound pressure level measured away from any reflective surfaces.
Frequency (f)	The number of cycles of pressure fluctuations within a given period of time. Measured in Hertz.
Hertz (Hz)	The unit of frequency or pitch of a sound. One hertz is equal to one cycle per second.
Octave Band	Band of frequencies where the upper limit of the band is twice the frequency of the lower limit. E.g., the 1000 Hz band contains noise energy at all frequencies from 707 to 1414 Hz.
Percentile Level ($L_{AN,T}$)	The A-Weighted Sound Pressure Level which is exceeded for N% of the specified time interval. E.g., the $L_{A90,1\text{hour}}$ is the A-weighted sound level exceeded for 90% of 1 hour.
Rating Level (L_{Ar,T_r})	Specific sound level plus any adjustment for the characteristic features of the sound.
Reference Time Interval (T)	Specified interval over which the specific sound level is determined.

Residual Sound	Ambient sound remaining at the assessment location when the specific sound source is suppressed to such a degree that it does not contribute to the ambient sound.
Residual Sound Level ($L_r = L_{Aeq,T}$)	Equivalent continuous A-weighted sound pressure level of the residual sound at the assessment location over a given time interval, T.
Sound Energy	The energy present in a sound field that causes mechanical vibration in any medium through which a sound wave passes. Measured in Joules (J).
Sound Energy Level (L_J)	The logarithm of the ratio of the sound energy (J) to the reference sound energy level (J_0). The reference value for sound energy is 1 pJ. Defined as: $L_J = 10 \log \left(\frac{J}{J_0} \right)$
Sound Exposure Level (L_{AE})	The level of sound, equal to 1 second of duration, that has the same sound energy as the actual noise event considered. Is also referred to as the SEL, or the LAX. Defined as: $L_{AE} = L_{Aeq} + 10 \log_{10}(t)$
Sound Power	The total sound energy radiated by a source, in all directions. Measured in watts (W).
Sound Power Level (L_W)	The logarithm of the ratio of the sound power (W) to the reference sound power level (W_0). The reference value for sound power is 1 pW. Defined as: $L_W = 10 \log \left(\frac{W}{W_0} \right)$
Sound Pressure	The difference between the pressure caused by a sound wave and the ambient pressure of the medium the sound wave is passing through. Measured in Pascals.
Sound Pressure Level (L_p)	The logarithm of the ratio of a given sound pressure (p) to the reference sound pressure (p_0). The reference value for sound pressure is 20 µPa. Defined as: $L_p = 20 \log \left(\frac{p}{p_0} \right)$
Sound Sources	Sounds generated by nature or human activity.
Specific Sound Level ($L_r = L_{Aeq,T}$)	Equivalent continuous A-weighted sound pressure level produced by the specific sound source at the assessment location over a given reference time interval, T_r .
Specific Sound Source	Sound source under assessment.
Third Octave Band	Octave bands sub divided into three frequency bands, equal to 23 % of the centre frequency.
Wavelength (λ)	The distance a sound wave travels in one cycle.