Operational Noise Management Plan

William Clarke College – Bryson Building

William Clarke College

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Prepared by:

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Revision	Date	Prepared By	Checked By	Authorised By
1.1	30 March 2026	Mark Irish	Tom Candalepas	Mark Irish
1.0	27 February 2026	Mark Irish	Tom Candalepas	Mark Irish

Basis of Report

This report has been prepared by SLR Consulting Australia (SLR) with all reasonable skill, care and diligence, and taking account of the timescale and resources allocated to it by agreement with William Clarke College (the Client). Information reported herein is based on the interpretation of data collected, which has been accepted in good faith as being accurate and valid.

This report is for the exclusive use of the Client. No warranties or guarantees are expressed or should be inferred by any third parties. This report may not be relied upon by other parties without written consent from SLR.

SLR disclaims any responsibility to the Client and others in respect of any matters outside the agreed scope of the work.

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1.0 Introduction

SLR Consulting Australia Pty Ltd (SLR) was engaged by Mostyn Copper on behalf of William Clarke College to prepare an Operational Noise Management Plan (ONMP) as per the requirement of Consent Condition E15 (SSD-35715221).

The potential operational noise impacts from the development were previously assessed in SLR Report *610.30786-R01-v1.3 Stage 1 Works Noise and Vibration Impact Assessment* (NVIA report), dated 20 March 2023.

SLR is suitably qualified to produce acoustic management plans. The author of this report is a member of the *Australian Acoustical Society (AAS)* and SLR is a member firm of the *Association of Australasian Acoustical Consultants (AAAC).*

1.1 Definitions

This ONMP uses several terms specific to environmental noise management that are defined below.

The term “noise” is defined as unwanted sound but commonly used when discussing all sound within our environment. In this report the term noise refers to all sound pressure levels irrespective of whether it would be defined as “unwanted”.

Noise levels are measured and assessed in terms of decibels (dB). When assessing impacts to people, noise levels are filtered (weighted) to the normal human response to loudness perceived by the ear. This is referenced as the A-weighted scale and is denoted in decibels by the unit dB(A).

The most common form of noise experienced by people is termed “airborne noise”, indicating that it propagates between the source and receptor primarily through the air.

A comprehensive Glossary of Acoustic Terms (including definitions of noise metrics) is provided in **Appendix A**.

1.2 Stage 1 Works Noise and Vibration Impact Assessment

The Stage 1 Works Noise and Vibration Impact Assessment (NVIA) sets noise emission criteria for the Bryson Building operations and included an assessment of noise impacts from various sources including the following:

- Outdoor play areas
- Mechanical plant (indicative)

Subsequent to the NVIA, during detailed design, acoustic treatments to buildings services with external noise emissions were recommended to meet environment noise targets as outlined in the NSW Noise Policy for Industry (NPfI), NVIA and the Development Consent.

2.0 Development Consent Requirements

Consent SSD-35715221 Condition E15 requires that an Operational Noise Management Plan must be prepared after commencement of operation of each stage of the development as shown in **Table 1**.

Table 1 Development Consent Requirements – Operational Noise Management Plan

Consent Condition	ONMP Section Reference
E15 Operational Noise Management Plan *Prior to the issue of any relevant occupation certificate, the Applicant must:* *a) prepare an Operational Noise Management Plan for the Bryson Building, incorporating the recommendations of Stage 1 Works Noise and Vibration Impact Assessment dated 20 March 2023 and prepared by SLR Consulting Australia Pty Ltd; and* *b) submit the Operational Noise Management Plan for each operational stage to and obtain approval of the Planning Secretary.*	**Section 1.2** **Section 4.0** **Section 5.0** **This report**

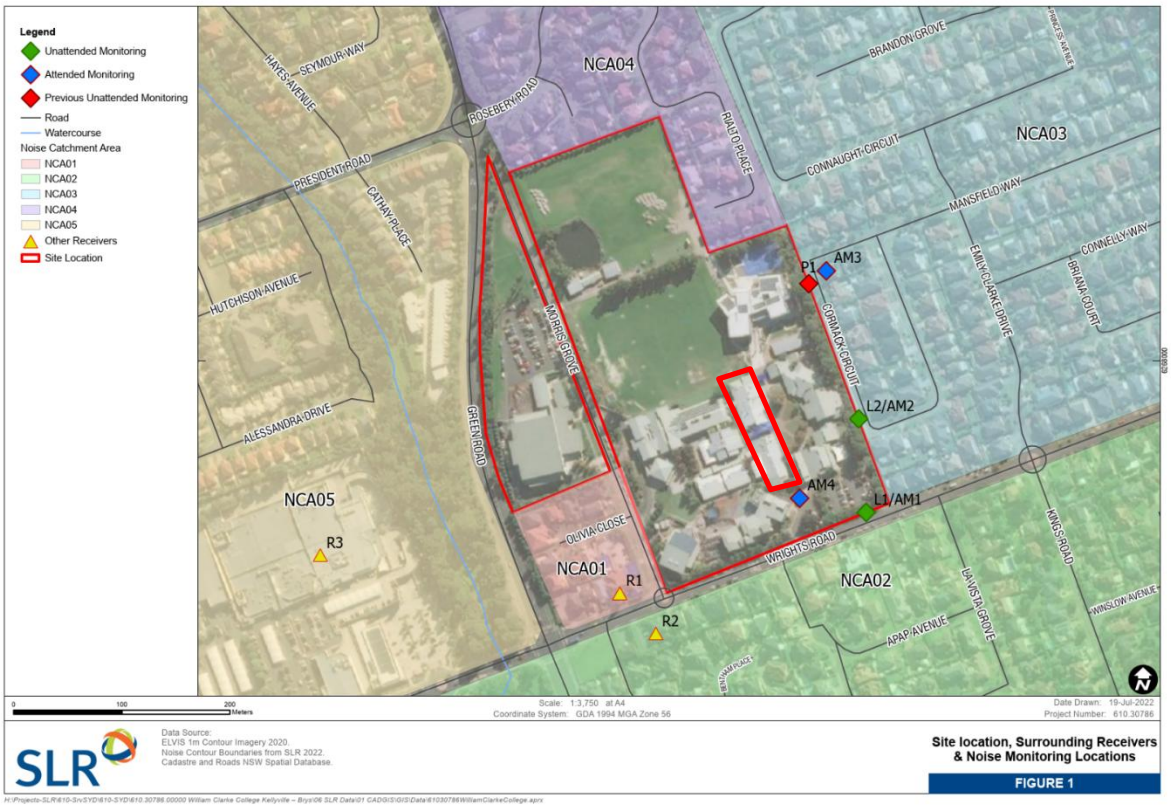
3.0 Noise Sensitive Receiver Locations

The nearest potentially affected receivers are detailed in **Table 2** and **Figure 1.** All identified receivers have been grouped into Noise Catchment Areas (NCA's) that reflect the ambient noise environment of that area, and the closest offset distance between the receiver area and the Bryson Building has been indicated.

Table 2 Surrounding sensitive receivers

NCA/ID	Type	Distance (m)	Direction
NCA01	Residential	135	West
NCA02		55	South
NCA03		85	East
NCA04		125	North
NCA05		260	West
R1 - 128 Wrights Rd, Kellyville (Kindalin, Childcare)	Educational	140	Southwest
R2 - 129 Wrights Rd, Castle Hill (ACE Parent, Paediatrician)	Commercial	160	Southwest
R3 - 90 Wrights Rd, Kellyville (Kellyville Village)		320	West

Figure 1 Site and Receiver Locations



4.0 Operational Noise Emission Levels

Recommended operational noise levels at surrounding receivers were identified in the NVIA report and are reproduced in this section.

4.1 Mechanical Plant and Equipment

The NSW EPA *Noise Policy for Industry* (NPfI) outlines the applicable procedure for assessing noise emissions from industrial noise sources (i.e. mechanical plant) through establishing project noise trigger levels at nearby noise-sensitive receivers. The project noise trigger levels are included in **Table 3,** and reference the receiver classification in **Figure 1.**

Table 3 Project Noise Trigger Level at Nearest Receivers

NCA	Receiver Type	Period	Project Noise Trigger Level L_{Aeq} (dBA)
NCA01	Residential	Daytime	42
		Evening	42
		Night-time	38
NCA02	Residential	Daytime	42
		Evening	42
		Night-time	38

NCA	Receiver Type	Period	Project Noise Trigger Level L_{Aeq} (dBA)
NCA03	Residential	Daytime	43
		Evening	43
		Night-time	38
NCA04	Residential	Daytime	45
		Evening	43
		Night-time	36
NCA05	Residential	Daytime	42
		Evening	42
		Night-time	38
R1	Educational Facility	When in Use	43
R2	Commercial	When in Use	63
R3	Commercial	When in Use	63

Note 1: Noise Policy for Industry (NPfI) assessment periods – Daytime: 7:00 am to 6:00 pm Monday to Saturday, 8:00 am to 6:00 pm Sundays and Public Holidays; Evening: 6:00 pm to 10:00 pm; Night: 10:00 pm to 8:00 am Monday to Saturday, 10:00 pm to 8:00 am Sundays and Public Holidays.

The State Environmental Planning Policy (Educational Establishments and Child Care Facilities) 2017 has two clauses which relate to noise emissions. It should be noted that compliance with the NPfI requirements will ensure compliance with Schedule 2 Clause 6 as the requirements overlap.

4.2 Operational Noise Criteria – College Hours

The NVIA report includes criteria for operational activities including outdoor play during College hours, reproduced in **Table 4**.

Table 4 Operational Noise Criteria – Student Activities

NCA	Duration	Criteria $L_{Aeq,15min}$ (dB)
NCA01	Up to 4 hours per day (2 hours in the morning, 2 hours in the afternoon)	47
NCA02		47
NCA03		48
NCA04		50
NCA05		47

Note 1: The assessment location is defined as the most affected point on or within any residential receiver property boundary.

4.3 Operational Noise Criteria – Out of Hours Events

The NVIA report recommends the criteria in **Table 5** be used, referencing the receiver classification in **Figure 1.**

Table 5 Operational Noise Criteria – OOH Events

NCA	Day	Time Periods	Relevant Criteria	Residential $L_{Aeq(15min)}$
NCA01	Monday – Sunday	07:00 – 23:00	$L_{Aeq(15min)}$ must not exceed RBL + 5 dB	42
		23:00 – 07:00	$L_{Aeq(15min)}$ must not exceed RBL	40
NCA02		07:00 – 23:00	$L_{Aeq(15min)}$ must not exceed RBL + 5 dB	42
		23:00 – 07:00	$L_{Aeq(15min)}$ must not exceed RBL	40
NCA03		07:00 – 23:00	$L_{Aeq(15min)}$ must not exceed RBL + 5 dB	43
		23:00 – 07:00	$L_{Aeq(15min)}$ must not exceed RBL	38
NCA04		07:00 – 23:00	$L_{Aeq(15min)}$ must not exceed RBL + 5 dB	45
		23:00 – 07:00	$L_{Aeq(15min)}$ must not exceed RBL	40
NCA05		07:00 – 23:00	$L_{Aeq(15min)}$ must not exceed RBL + 5 dB	43
		23:00 – 07:00	$L_{Aeq(15min)}$ must not exceed RBL	38

5.0 Operational Noise Management

5.1 College Operations

The College operations are understood to comprise the following.

- Campus wide student numbers – 2,000
- Bryson Building student occupation numbers – 600
- Approximately 200 staff across the campus
- Out of School Hours (OOSH) events in the Bryson Building – limited to meetings and a few breakfast and dinner events each year. There is no specific schedule for these events.

5.2 Administrative Controls

Operational noise associated with the College is required to be suitably managed, in order to achieve compliance with the noise criteria in **Section 4.0.**

In order to achieve compliance with the noise criteria, it is recommended that the College considers relevant noise management measures “where reasonable and practicable”. This is particularly applicable to OOSH events.

All staff and contractors are to be made aware of and issued with the ONMP.

Best management practices involve adopting operational procedures that minimise noise in a sustainable and pragmatic manner. Administrative controls within this Plan are defined in **Table 6**.

Table 6 Administrative Noise Controls for Out of Hours Events

Administrative Noise Control	Details / Rationale
Use signage in key locations within the premises and near entries/exits to raise patron awareness of nearby noise-sensitive locations.	To encourage visitors and patrons to be respectful and considerate of surrounding residents.
All staff and contractors are to be made aware of and issued with the ONMP	Staff awareness relating to noise management issues.
Educating staff and any external contractors about noise and quiet work practices.	Increase staff awareness relating to noise management issues by inclusion in their regular training
Update the ONMP	Update this ONMP to adjust to changes in operating conditions.

5.3 Noise associated with Plant and Equipment

All plant and equipment will be operated in accordance with manufacturers specifications. Any faults or repairs that result in additional increased noise are to be addressed as soon as possible through the provision of an appropriate servicing regime.

5.4 Noise Complaints

While the operational noise sources in the NVIA are considered unlikely to disturb adjoining residents and be a source of complaints, an online system is available to residents via the College website to record nuisances / complaints in a reasonable timeframe.

The online complaint form will capture all relevant information in one place, including the following which may be relevant to a noise complaint:

- Unique identification number for future reference
- Time and date of complaint as received
- Location where the noise was perceived (indoors, outdoors, exact location if possible)
- Approximate time and date of event associated with the complaint
- Times when noise is audible (daytime, evening, present at a particular time or all the time)
- Subjective perception of the noise level (clearly audible all the time, clearly audible during breaks in traffic, just audible during the day at times, just audible in the evening at times
- Perception of noise character (can the noise be described as low frequency, high frequency, no particular frequency, steady, intermittent, children noises)

The online complaint form gets internally transferred to the responsible person (the Complaint Recipient) dependent on the nature of the complaint. The Complaint Recipient will then manage the resolution of the complaint.

An electronic copy of the details provided by the complainant will be kept by William Clarke College. A detailed qualitative description of the nuisance source should be collected to help identify the noise sources that might be causing the annoyance.

5.4.1 Complaint Management Procedure

The Complaint Recipient will manage noise complaints in a timely and structured manner, with the aim of addressing issues as early as possible. Where feasible, matters will be addressed at the time they are first raised.

All noise complaints will be formally received and acknowledged by the Complaint Recipient without delay.

Once the complaint has been reviewed and any relevant inquiries completed, the Complaint Recipient will notify the complainant of the outcome. This notification will outline the determination made, the basis for that determination, and any measures implemented to address the issue, where applicable.

The College will retain records of each complaint, including the findings of the review, whether the complaint was upheld in whole or in part, and any actions or recommendations arising from the process.

5.4.2 Noise Complaint Investigation

Noise complaint investigation may be deemed necessary when several complaints are received within a short period of time (e.g. more than two complaints within a week), and in a reasonable timeframe with respect to the occurrence of an event. The investigation will entail:

- Substantiated complaints to be investigated, and determine extent and where reasonable and feasible, recommend mitigation options
- Where deemed necessary by the College, operational noise monitoring (compliant with **Section 6.0** where appropriate) may be undertaken at a subsequent event to accurately determine the cause of substantiated complaint/incidents and to determine how to rectify
- File incident report
- Supply a response in writing within 10 working days of the complaint, where determined appropriate

6.0 Operational Noise Monitoring

In the event of repeated noise complaints or when deemed necessary by the College, operational noise monitoring may be undertaken to help determine the cause of substantiated complaint/incidents and to determine how to mitigate or manage any excessive noise emission (with reference to the NVIA criteria).

The College may elect to conduct an initial screening noise assessment of the identified noise source to assess the merit of the complaint and determine whether there is an ongoing issue that requires further investigation.

Where a more detailed assessment is considered to be necessary, the attended noise measurements should be undertaken by a suitably qualified and experienced acoustic consultant. All items of acoustic instrumentation utilised will be designed to comply with

AS/NZS IEC 61672.1-2019 Electroacoustics – Sound level meters (AS IEC 61672) and carry current calibration certificates.

The noise measurements should generally include the following, unless otherwise justified in the accompanying report:

- 15-minute measured A-weighted noise levels at the selected monitoring locations, including L_{Amax}, L_{Aeq}, and L_{A90}, and measured Z-weighted frequency spectrum in 1/3 octaves
- The modifying factor corrections in *Table C1 in Fact Sheet C of the Noise Policy for Industry (NSW EPA, 2017)* may be applied, if appropriate, to the noise measurements by the noise monitoring equipment
- Noise monitoring must be undertaken at each representative location of the nearest sensitive receivers, for a minimum of 15 minutes at each location
- Representative receiver locations are to be selected based on the noise source location and any distance or screening attenuation.
- Contribution of the development to the measured noise levels
- Details of the activities being undertaken onsite during the measurement, associated noise sources and contributions to the measured noise levels. This should identify which noise source is dominant if discernible
- Details of any extraneous noise during the measurement, including its source (if discernible) and contribution to the measured noise levels
- Wind speed and direction during the measurement
- Any other relevant observations made during the measurement
- Noise measurement should not be undertaken when wind at microphone heights exceeds 5 metres per second (m/s), or during rain

6.1 Noise Monitoring Report Requirements

A noise monitoring report will be prepared following each noise monitoring survey. The results of the noise monitoring reports will be included in any compliance reporting for the development, where required.

The noise monitoring report must include the following, at a minimum:

- The type of measurements conducted (eg, direct measurement at compliance location, measurement at intermediate location, etc)
- Details of the noise monitoring locations, and justification for their selection based on any distance or screening attenuation
- Name and position of personnel undertaking measurements
- The acoustic instrumentation used for the measurements, including serial numbers where applicable
- Details of the date, time, and duration of the measurements
- All relevant measurement details
- Details of the weather conditions during the measurement, including the instrumentation and/or weather station where applicable

- The relevant noise limits at compliance locations
- The results of the noise measurements at each monitoring location
- A statement outlining the development's compliance status, and the reasons for any identified non-compliance

7.0 Compliance Exceedances

Where detailed noise monitoring (refer **Section 6.0**) determines that noise goals are not reliably achieved, a suitably qualified and experienced acoustic consultant is to undertake a review of the noise monitoring exceedances in order to provide advice on potential noise mitigation or management measures.

In general, the steps to review and implement further reasonable and practicable mitigation will likely include:

- Identifying where the noise levels are exceeded and by how much
- Confirming the noise reduction performance of mitigation applied
- Quantifying any significant change in noise levels
- Identifying the key noise sources contributing to the exceedances
- Undertaking a review of reasonable and practicable mitigation measures available to further reduce and control noise levels
- Where reasonable and practicable, implementing additional mitigation

The compliance review should be undertaken within one month following the completion of the noise monitoring report, and the review should include an assessment of steps to be undertaken and anticipated timing to implement this.

8.0 Review and Improvement of Noise Management Plan

This ONMP will be reviewed, and if necessary, may be, such as under the following circumstances:

- Significant changes to the College operations and OOSH events occurring within the premises
- Where it is identified via complaints response or monitoring that the noise emission from the College is not meeting the objectives of the ONMP
- At the request of the relevant regulatory authority or other relevant government agency

All staff and contractors will be informed of any revisions to the ONMP by College Management.

Appendix A Acoustic Terminology

Operational Noise Management Plan

William Clarke College – Bryson Building

William Clarke College

SLR Project No.: 610.30786.00002

30 March 2026

1. Sound Level or Noise Level

The terms 'sound' and 'noise' are almost interchangeable, except that 'noise' often refers to unwanted sound.

Sound (or noise) consists of minute fluctuations in atmospheric pressure. The human ear responds to changes in sound pressure over a very wide range with the loudest sound pressure to which the human ear can respond being ten million times greater than the softest. The decibel (abbreviated as dB) scale reduces this ratio to a more manageable size by the use of logarithms.

The symbols SPL, L or LP are commonly used to represent Sound Pressure Level. The symbol LA represents A-weighted Sound Pressure Level. The standard reference unit for Sound Pressure Levels expressed in decibels is 2 x 10^{-5} Pa.

2. 'A' Weighted Sound Pressure Level

The overall level of a sound is usually expressed in terms of dBA, which is measured using a sound level meter with an 'A-weighting' filter. This is an electronic filter having a frequency response corresponding approximately to that of human hearing.

People's hearing is most sensitive to sounds at mid frequencies (500 Hz to 4,000 Hz), and less sensitive at lower and higher frequencies. Different sources having the same dBA level generally sound about equally loud.

A change of 1 dB or 2 dB in the level of a sound is difficult for most people to detect, whilst a 3 dB to 5 dB change corresponds to a small but noticeable change in loudness. A 10 dB change corresponds to an approximate doubling or halving in loudness. The table below lists examples of typical noise levels.

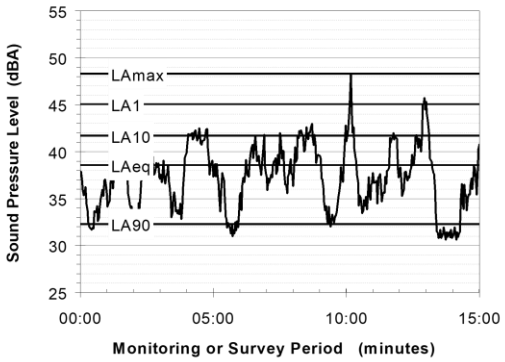
Sound Pressure Level (dBA)	Typical Source	Subjective Evaluation
130	Threshold of pain	Intolerable
120	Heavy rock concert	Extremely noisy
110	Grinding on steel	
100	Loud car horn at 3 m	Very noisy
90	Construction site with pneumatic hammering	
80	Kerbside of busy street	Loud
70	Loud radio or television	
60	Department store	Moderate to quiet
50	General Office	
40	Inside private office	Quiet to very quiet
30	Inside bedroom	
20	Recording studio	Almost silent

The relationship between Sound Power and Sound Pressure is similar to the effect of an electric radiator, which is characterised by a power rating but has an effect on the surrounding environment that can be measured in terms of a different parameter, temperature.

3. Statistical Noise Levels

Sounds that vary in level over time, such as road traffic noise and most community noise, are commonly described in terms of the statistical exceedance levels LAN, where LAN is the A-weighted sound pressure level exceeded for N% of a given measurement period. For example, the LA1 is the noise level exceeded for 1% of the time, LA10 the noise exceeded for 10% of the time, and so on.

The following figure presents a hypothetical 15 minute noise survey, illustrating various common statistical indices of interest.



Of particular relevance, are:

LA1 The noise level exceeded for 1% of the 15 minute interval.

LA10 The noise level exceeded for 10% of the 15 minute interval. This is commonly referred to as the average maximum noise level.

LA90 The noise level exceeded for 90% of the sample period. This noise level is described as the average minimum background sound level (in the absence of the source under consideration), or simply the background level.

LAeq The A-weighted equivalent noise level (basically, the average noise level). It is defined as the steady sound level that contains the same amount of acoustical energy as the corresponding time-varying sound.

4. Frequency Analysis

Frequency analysis is the process used to examine the tones (or frequency components) which make up the overall noise or vibration signal.

The units for frequency are Hertz (Hz), which represent the number of cycles per second.

Frequency analysis can be in:

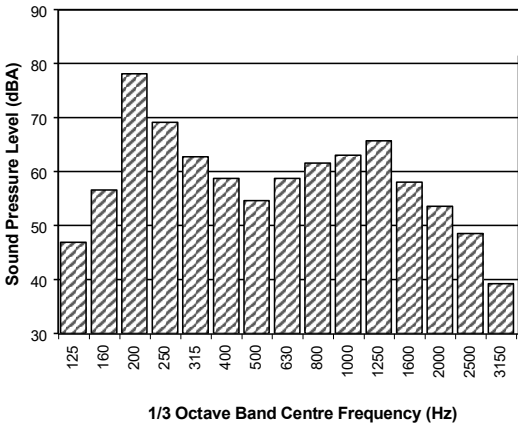
- Octave bands (where the centre frequency and width of each band is double the previous band)
- 1/3 octave bands (three bands in each octave band)

Other weightings (eg B, C and D) are less commonly used than A-weighting. Sound Levels measured without any weighting are referred to as 'linear', and the units are expressed as dB(lin) or dB.

5. Sound Power Level

The Sound Power of a source is the rate at which it emits acoustic energy. As with Sound Pressure Levels, Sound Power Levels are expressed in decibel units (dB or dBA), but may be identified by the symbols SWL or LW, or by the reference unit 10^{-12} W.

The following figure shows a 1/3 octave band frequency analysis where the noise is dominated by the 200 Hz band. Note that the indicated level of each individual band is less than the overall level, which is the logarithmic sum of the bands.



6. Annoying Noise (Special Audible Characteristics)

A louder noise will generally be more annoying to nearby receivers than a quieter one. However, noise is often also found to be more annoying and result in larger impacts where the following characteristics are apparent:

- **Tonality** - tonal noise contains one or more prominent tones (ie differences in distinct frequency components between adjoining octave or 1/3 octave bands), and is normally regarded as more annoying than 'broad band' noise.
- **Impulsiveness** - an impulsive noise is characterised by one or more short sharp peaks in the time domain, such as occurs during hammering.
- **Intermittency** - intermittent noise varies in level with the change in level being clearly audible. An example would include mechanical plant cycling on and off.
- **Low Frequency Noise** - low frequency noise contains significant energy in the lower frequency bands, which are typically taken to be in the 10 to 160 Hz region.

7. Vibration

Narrow band (where the spectrum is divided into 400 or more bands of equal width)

The common units for velocity are millimetres per second (mm/s). As with noise, decibel units can also be used, in which case the reference level should always be stated. A vibration level V, expressed in mm/s can be converted to decibels by the formula 20 log (V/Vo), where Vo is the reference level (10^{-9} m/s). Care is required in this regard, as other reference levels may be used.

8. Human Perception of Vibration

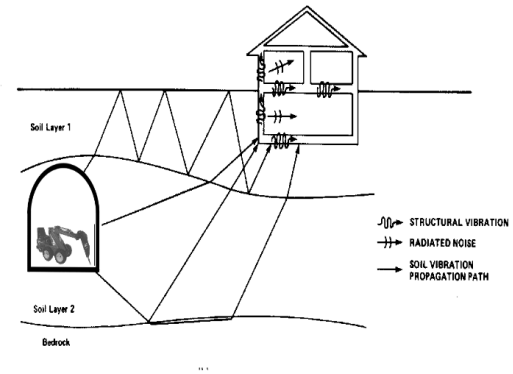
People are able to 'feel' vibration at levels lower than those required to cause even superficial damage to the most susceptible classes of building (even though they may not be disturbed by the motion). An individual's perception of motion or response to vibration depends very strongly on previous experience and expectations, and on other connotations associated with the perceived source of the vibration. For example, the vibration that a person responds to as 'normal' in a car, bus or train is considerably higher than what is perceived as 'normal' in a shop, office or dwelling.

9. Ground-borne Noise, Structure-borne Noise and Regenerated Noise

Noise that propagates through a structure as vibration and is radiated by vibrating wall and floor surfaces is termed 'structure-borne noise', 'ground-borne noise' or 'regenerated noise'. This noise originates as vibration and propagates between the source and receiver through the ground and/or building structural elements, rather than through the air.

Typical sources of ground-borne or structure-borne noise include tunnelling works, underground railways, excavation plant (eg rockbreakers), and building services plant (eg fans, compressors and generators).

The following figure presents an example of the various paths by which vibration and ground-borne noise may be transmitted between a source and receiver for construction activities occurring within a tunnel.



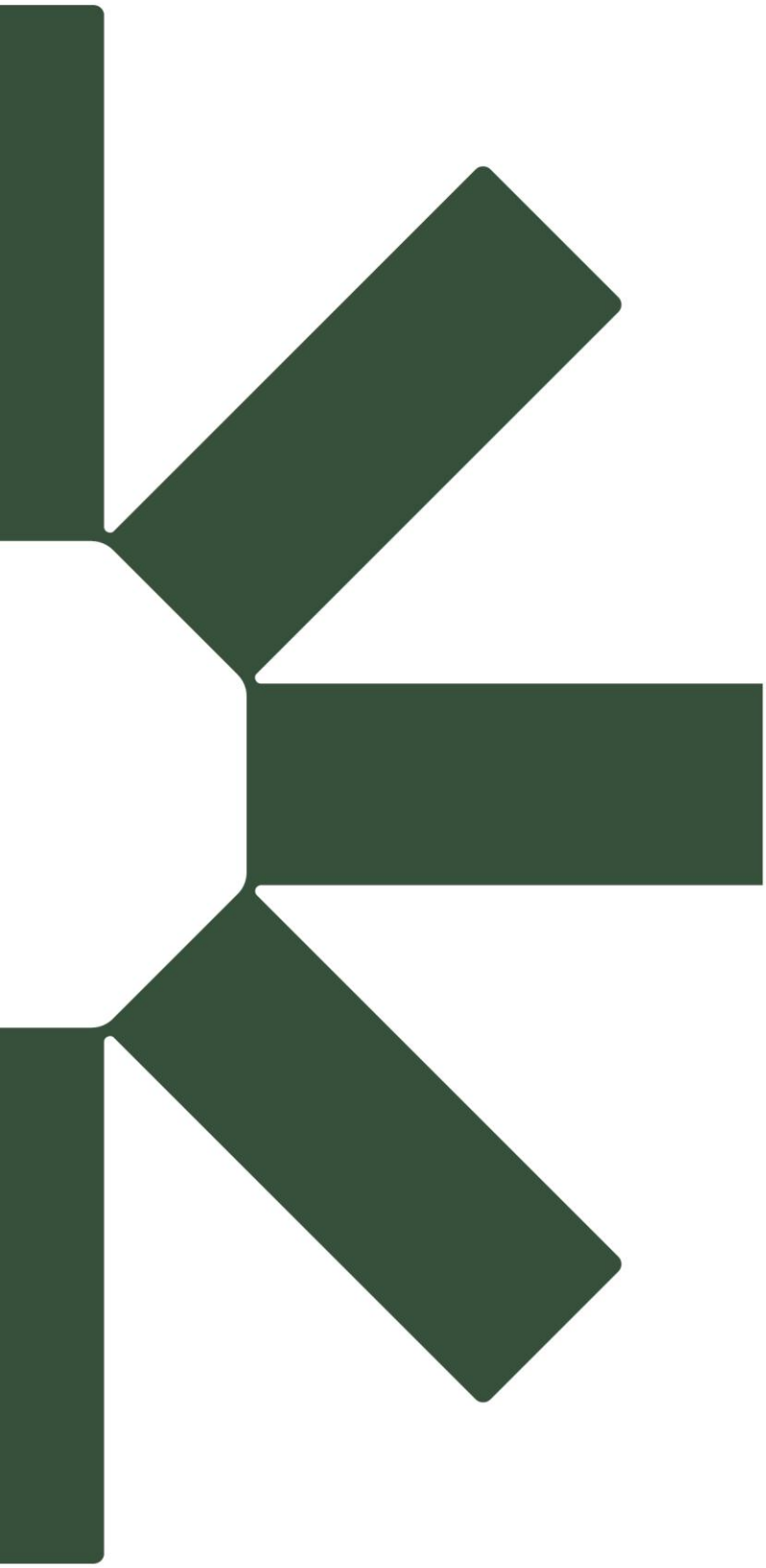
The term 'regenerated noise' is also used in other instances where energy is converted to noise away from the primary source. One example would be a fan blowing air through a discharge grill. The fan is the energy source and primary noise source. Additional

Vibration may be defined as cyclic or transient motion. This motion can be measured in terms of its displacement, velocity or acceleration. Most assessments of human response to vibration or the risk of damage to buildings use measurements of vibration velocity. These may be expressed in terms of ‘peak’ velocity or ‘rms’ velocity.

The former is the maximum instantaneous velocity, without any averaging, and is sometimes referred to as ‘peak particle velocity’, or PPV. The latter incorporates ‘root mean squared’ averaging over some defined time period.

Vibration measurements may be carried out in a single axis or alternatively as triaxial measurements (ie vertical, longitudinal and transverse).

noise may be created by the aerodynamic effect of the discharge grill in the airstream. This secondary noise is referred to as regenerated noise.



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