DHL LEPPINGTON

Operational Noise Management Plan

Prepared for:

ESR Australia
Level 29, 20 Bond St,
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BASIS OF REPORT

This report has been prepared by SLR Consulting Australia Pty Ltd (SLR) with all reasonable skill, care and diligence, and taking account of the timescale and resources allocated to it by agreement with ESR Australia (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.

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DOCUMENT CONTROL

Reference	Date	Prepared	Checked	Authorised
610.30632-R01-v1.0	19 November 2021	Antony Williams	Aaron McKenzie	Antony Williams

CONTENTS

DOCUMENT REFERENCES

TABLES

FIGURES

APPENDICES

1 Introduction

1.1 Background

SLR Consulting Australia Pty Ltd (SLR) has been engaged by ESR Developments (Australia) to prepare an Operational Noise Management Plan (ONMP) for the operation of the DHL warehouse at Lot 4 of Bringelly Business Hub.

ESR received approval on 30 November 2020 in SSD-8586218 for the construction and operation of a light industrial building on the lot. The potential noise impacts from the development were assessed as part of the SSDA in SLR Report *610.17734-R10 – Lot 4, Bringelly Road Business Hub – Noise Impact Assessment*, dated August 2020 (the SSDA NIA).

SLR is suitably qualified and endorsed by the Planning Secretary to produce SSD noise impact assessments. SLR is a member of the Australian Acoustical Society (AAS) and a member firm of the Association of Australasian Acoustical Consultants (AAAC).

This report details the management measures that will be used to minimise operational noise emission from the site.

The following report uses specialist acoustic terminology. An explanation of common terms is provided in **Appendix A**.

1.2 Site Overview

The facility involves the delivery and storage of products, along with office and support facilities. The development forms part of the 19-hectare Bringelly Business Hub which was granted development consent in January 2016 for predominantly light industrial and retail development.

The site location is shown in **Figure 1** and proposed layout of the facility is shown in **Figure 2**.

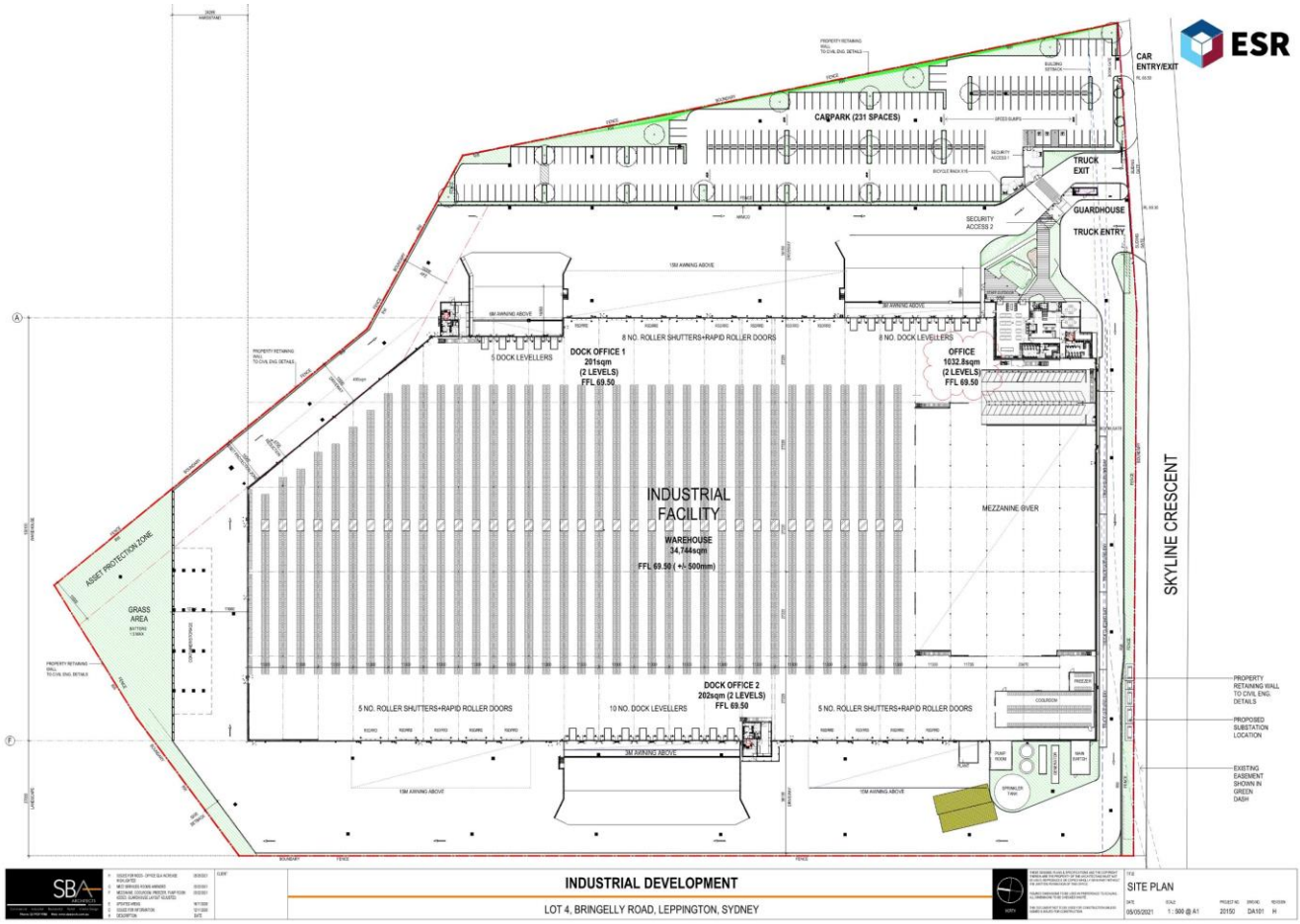
Figure 1 Site Location, Surrounding Receivers and Noise Monitoring Locations

Warehouse operating hours are 24 hours per day, seven days a week. The sources of noise from the facility include:

- Truck and light vehicle movements on internal access roads and in parking areas
- Loading of trucks in the various loading docks
- Truck parking
- Roof mounted mechanical plant.

A 230 space car park is situated to the east of the facility and a truck access route runs along the boundary of the site.

Figure 2 Site Layout



1.3 Nearest Receivers

The nearest sensitive receivers are residential dwellings to the north-east on Stuart Road. The closest of these is around 200 m away. Additional residential receivers are also located to the west and east, although these are more distant and are generally shielded by the buildings on the adjoining lots.

The nearest receivers are shown in **Figure 1**, with details of the nearest potentially affected sensitive receivers in **Table 1**.

Table 1 Surrounding Sensitive Receivers

ID	Address	Type	Distance (m)	Direction
R01	12 Bringelly Road, Horningsea Park (abandoned condition)	Residential	80 m	East
R02	12 Bringelly Road, Horningsea Park	Residential	85 m	East
R03	Properties across Cowpasture Road	Residential	420 m	East
R04	Residential properties on Stuart Road	Residential	200 m	North-east
R05	Properties on Stuart Road	Residential	250 m	West
R06	MindChamps Early Learning Centre	Childcare Centre	250 m	North-east
R07	CEA Office Building	Commercial	70 m	East
R08	Proposed Bunnings Warehouse Building	Commercial	35 m	West

1.4 Development Consent

Development Consent SSD-8586218 was approved by the Department of Planning, Industry and Environment (DPIE) in November 2020. The requirements relevant to noise and vibration are shown in **Table 2**.

Table 2 Development Consent Approval Conditions Relevant to this ONMP

Condition	Where addressed in this document
Operational Noise Management Plan	
B23. Prior to commencement of operation, the Applicant must prepare a Noise Management Plan (NMP) to the satisfaction of the Planning Secretary. The NMP must identify and implement strategies to minimise noise from the development and must:	This document
(a) be prepared or reviewed and certified by a suitably qualified acoustic consultant who is a member of the Australian Acoustical Society or employed by an Association of Australasian Acoustical Consultants (AAAC) member firm;	**Section 1**
(b) describe approaches for promoting noise awareness by staff and drivers;	**Section 3**
(c) include measures to minimise noise from the airbrakes of heavy vehicles during the operation of the development between 10 pm and 7 am Monday to Sunday;	**Section 3**
(d) incorporate training procedures;	**Section 3**
(e) include a complaint lodgement procedure to ensure that members of the public and local residents are able to report noise issues;	**Section 3.2**
(f) provide an ongoing review process and a plan for responding to noise complaints; and	**Section 3.2, 3.4**
(g) specify the responsibilities of site personnel in managing noise and include a detailed list of steps taken to manage potential noise impacts.	**Section 3.3**

2 Operational Noise

The SSDA NIA assessed operational noise from the development and should be referenced where further information is required.

2.1 Noise Policy for Industry

The *Noise Policy for Industry* (NPfI) was released in 2017 and sets out the NSW EPA's requirements for the assessment and management of noise from industry in NSW.

2.1.1 Trigger Levels

The NPfI describes 'trigger levels' which indicate the noise level at which feasible and reasonable noise management measures should be considered. Two forms of noise criteria are provided – one to account for 'intrusive' noise impacts and one to protect the 'amenity' of particular land uses.

- The **intrusiveness** of an industrial noise source is generally considered acceptable if the L_{Aeq} noise level of the source, measured over a period of 15 minutes, does not exceed the background noise level by more than 5 dB. Intrusive noise levels are only applied to residential receivers. For other receiver types, only the amenity levels apply.
- To limit continual increases in noise levels from the use of the intrusiveness level alone, the ambient noise level within an area from all industrial sources should remain below the recommended **amenity** levels specified in the NPfI for that particular land use.

For this assessment, the area surrounding the proposal is considered to be 'suburban'.

2.1.2 Project Specific Criteria

The noise emission trigger levels for industrial noise generated by the facility are provided in **Table 3**. The Project Specific Noise Trigger Level is the lowest value of the intrusiveness or amenity noise level for each period and these are shown in the table in bold.

Table 3 Project Specific Noise Trigger Levels

Receivers	Period	Recommended Amenity Noise Level L_{Aeq} (dBA)	Measured Noise Level (dBA)		Project Noise Trigger Levels $L_{Aeq(15minute)}$ (dBA)	
			RBL[1]	$L_{Aeq(period)}$	Intrusiveness	Amenity[2,3]
Residential to the north (R04)	Daytime	55	39	53	**44**	53
	Evening	45	36	51	**41**	43
	Night-time	40	31	48	**36**	38
Residential to the east (R01 – R03)	Daytime	55	46	55	**51**	53
	Evening	45	45	53	50	**43**
	Night-time	40	37	52	42	**40**[4]
Residential to the west (R05)	Daytime	55	44	51	**49**	53
	Evening	45	43	54	48	**43**
	Night-time	40	39	49	44	**38**
Childcare centres[5] (R06)	When in use	50	n/a	n/a	n/a	**48**
Commercial receivers (R07 & R08)	When in use	65	n/a	n/a	n/a	**63**

Note 1: RBL = Rating Background Level.

Note 2: The recommended amenity noise levels have been reduced by 5 dB, where appropriate, to give the project amenity noise levels due to other sources of industrial noise being in the area.

Note 3: The project amenity noise levels have been converted to a 15-minute level by adding 3 dB.

Note 4: The measured L_{Aeq} noise level was dominated by road traffic noise and exceeds the recommended amenity noise level by 10 dB or more, therefore the 'high traffic project amenity noise level' is the existing $L_{Aeq(traffic)}$ noise level minus 15 dB.

Note 5: The NPfI and AS2107 do not provide specific guideline noise levels for childcare centres, as such an internal criterion of 40 dBA has been used with a 10 dB external to internal, which is generally considered representative of windows being partially open for ventilation

Sleep Disturbance

The NPfI defines the sleep disturbance screening level as 52 dBA L_{AFmax} or the prevailing background level plus 15 dB, whichever is greater.

The sleep disturbance screening levels for the development are shown in **Table 4**.

Table 4 Sleep Disturbance Screening Levels

Location	Noise Level (dBA)	
	Measured Prevailing Night-time Background Level	Sleep Disturbance Screening Level[1]
Residential to the north (R04)	31	52
Residential to the east (R01 – R03)	37	52
Residential to the west (R05)	39	54

Note 1: The sleep disturbance screening level as 52 dBA L_{AFmax} or the prevailing background level plus 15 dB, whichever is greater.

2.2 Predicted Operational Noise Impacts

The SSDA NIA generally predicted compliance at the nearest receivers during operation of the development. The following minor exceedances were predicted:

- A relatively minor exceedance of 2 dB during the daytime and night-time was predicted at the nearest residential receiver to the north-east (at receiver R04). The predicted exceedances were caused by truck movements around the site boundary near the truck parking area. Noise from all other activities was predicted to comply with the goals during all periods.
- Noise from truck air brakes were predicted to exceed the night-time sleep disturbance goal at the residences to the north and east by between 4 and 8 dB. The use of truck airbrakes is however expected to be an infrequent event (during loading of trucks only) and the impacts from this were considered relatively minor given existing noise levels in the area are controlled by road traffic movements on the surrounding road network.

3 Operating Management Measures

The site will be operated in line with best management practices to minimise noise emissions as far as practicable. The management measures that will be applied to the site are listed below.

3.1 Best Management Practices

- Site inductions for staff, contractors and visitors to the site will include consideration of noise with the intent to minimise emissions. Specific mention of the following will be included:
  - The potential for noise issues due to site emissions and the preference for quiet work practices
  - Locations of nearby noise sensitive receivers (refer to **Section 1.3**).
- All plant and equipment operated on the site will be suitably maintained and operated in a manner to minimise noise emissions.
- The simultaneous use of multiple items of significant noise generating equipment will be avoided wherever practicable.
- The use of noisy equipment will be scheduled during the daytime period, where practicable.
- Where practicable, all roller doors will be closed during the night-time period.
- The volume of reversing and start-up alarms will be reduced to the minimum practicable level (while still complying with safety regulations) and the least intrusive alarms will be utilised.
- Outdoor fixed plant (such as mechanical plant) will be enclosed, where practicable.
- Doors and seals of enclosures housing noise generating equipment will be well maintained and kept closed when not in use.
- The effectiveness of any noise suppression equipment on plant will be maintained and defective plant will not be used until repaired.
- Truck queuing and unnecessary trips will be minimised through appropriate planning of delivery routes and work practices to minimise heavy vehicle noise emissions.
- Vehicles will enter and exit the site in a forward direction, where possible, to minimise noise from reversing alarms particularly during the night-time.
- All truck drivers will be provided with training and instructions regarding minimising noise impacts from their vehicles, particularly with regard to minimising the use of airbrakes during the night-time when in the northern portion of the site.
- All trucks and delivery vehicles will switch off their engines during idle periods and loading/unloading operations, particularly during the night-time period.
- All trucks will have mufflers that are regularly maintained and in good working order.
- Should a non-compliance with the conditions in this ONMP be identified, operations will be modified to ensure compliance. A non-compliance register will be maintained by the Warehouse Manager, as detailed in **Section 3.3**.

3.2 Complaints

Complaints are be able to be made via the contact telephone number (02 8759 7000).

A complaints register will be maintained by the Warehouse Manager. Response to the complaint will be provided to the complainant within 24 hours.

Information recorded in the complaints register with respect to each complaint will include, but not necessarily be limited to:

- Date and time of complaint
- Method of complaint (telephone, mail, email, etc)
- Name, address and telephone number of complainant if supplied, otherwise, a note stating details not supplied
- Nature of complaint including details of the noise leading to the complaint and the time of occurrence and duration of the event
- Record of operational conditions at the time of the complaint
- Response actions taken to date in relation to the complaint, including any corrective measures that have been applied to reduce noise emissions and any follow-up contact made with the complainant. If no action was taken, the reason for the inaction shall be noted.

All employees and contractors who take receipt of a complaint, either verbal or written, will immediately notify the Warehouse Manager.

3.3 Site Personnel Responsibilities

The following personnel have responsibilities in management noise:

- Babin Baby – Warehouse Manager.

3.4 Review and Improvement of Noise Management Plan

This ONMP will be reviewed after 12 months of operations to ensure it adequately addresses the Conditions of Consent. Following that, this ONMP will be reviewed bi-annually.

This ONMP will be reviewed and, if necessary, updated within three months of the following:

- Submission of an incident report or an annual review
- Approval of an application to modify the site or the Project Approval
- Significant changes to the operation and/or management of the site (including change of ownership or occupancy)
- Significant changes to the equipment, machinery and plant operated on the site
- Where a non-compliance occurs or environmental performance measure is not achieved
- At the request of any relevant government agency.

All employees and contractors will be informed of any revisions to work procedures or actives required in the ONMP by Warehouse Management during toolbox talks.

APPENDIX A

Acoustic Terminology

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

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.

3. Sound Power Level

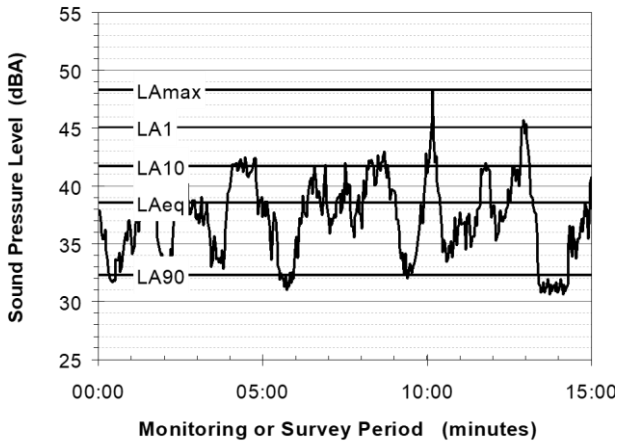
The Sound Power of a source is the rate at which it emits acoustic energy. As with Sound Pressure Levels, Sound Power Levels are expressed in decibel units (dB or dBA), but may be identified by the symbols SWL or LW, or by the reference unit 10^{-12} W.

The 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.

4. 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.

5. Frequency Analysis

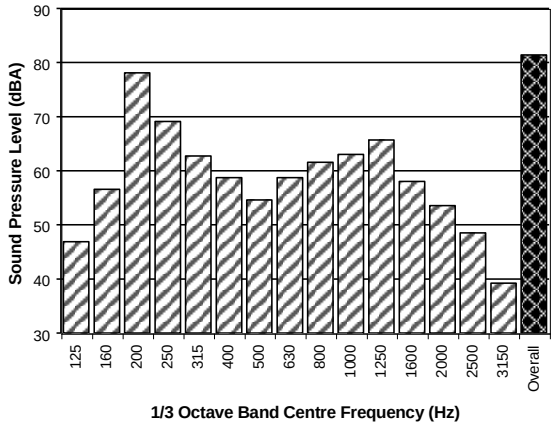
Frequency analysis is the process used to examine the tones (or frequency components) which make up the overall noise or vibration signal.

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

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

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).

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

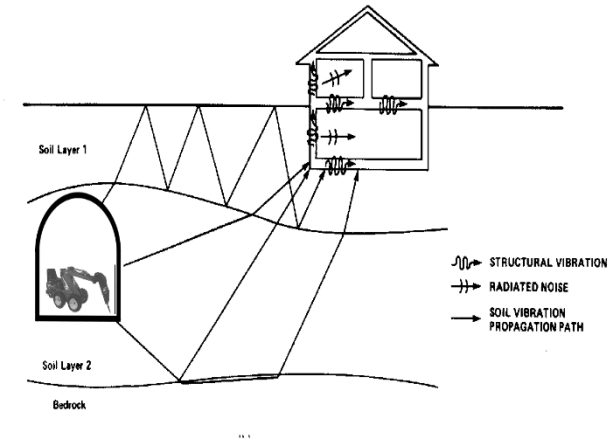
People are able to 'feel' vibration at levels lower than those required to cause even superficial damage to the most susceptible classes of building (even though they may not be disturbed by the motion). An individual's perception of motion or response to vibration depends very strongly on previous experience 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 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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