

Transportation Noise Assessment

Ascot Racecourse Structure Plan

Reference: 23118540-01

Prepared for:
Perth Racing C/- Davison Advisory Services

Reference: 23118540-01

Lloyd George Acoustics Pty Ltd

ABN: 79 125 812 544

PO Box 717

Hillarys WA 6923

www.lgacoustics.com.au

Contacts	General	Daniel Lloyd	Terry George	Matt Moyle
E:	info@lgacoustics.com.au	daniel@lgacoustics.com.au	terry@lgacoustics.com.au	matt@lgacoustics.com.au
P:	9401 7770	0439 032 844	0400 414 197	0412 611 330
Contacts	Rob Connolly	Daryl Thompson	Hao Tran	Matt Nolan
E:	rob@lgacoustics.com.au	daryl@lgacoustics.com.au	hao@lgacoustics.com.au	matt.nolan@lgacoustics.com.au
P:	0410 107 440	0420 364 650	0438 481 207	0448 912 604

This report has been prepared in accordance with the scope of services described in the contract or agreement between Lloyd George Acoustics Pty Ltd and the Client. The report relies upon data, surveys, measurements and results taken at or under the particular times and conditions specified herein. Any findings, conclusions or recommendations only apply to the aforementioned circumstances and no greater reliance should be assumed or drawn by the Client. Furthermore, the report has been prepared solely for use by the Client, and Lloyd George Acoustics Pty Ltd accepts no responsibility for its use by other parties.

Date	Rev	Description	Author	Verified
16-Nov-23	0	Issued to Client	Terry George	-

CONTENTS

1. INTRODUCTION.....1

2. CRITERIA.....2

3. METHODOLOGY 3

4. RESULTS 5

5. CONSLUSION 6

List of Tables

Table 2-1: Noise Targets for Noise Sensitive Land-Use 2

Table 1-1: Transport Corridor Classification and Trigger Distances 3

List of Figures

Figure 1-1: Structure Plan Precincts 1

Figure 1-2: Subject Site Locality in Relation to Road (Source: DPLH PlanWA) 3

Figure 3-2: Noise Exposure Forecast Table from Guidelines.....4

Figure 4-1: Exposure Levels to Upper Floors of Noise Sensitive Buildings 5

Appendices

Appendix A – Quiet House Packages 7

Appendix B – Terminology..... 11

1. INTRODUCTION

A Local Structure Plan (LSP) and Scheme Amendment are being prepared for landholdings in Ascot, referred to as the Ascot Racecourse Structure Plan (refer *Figure 1-1*). Parts of the site will be potentially impacted by road traffic noise, being the subject of this report, with consideration given to *State Planning Policy No. 5.4 Road and Rail Noise*, being the subject of this report.

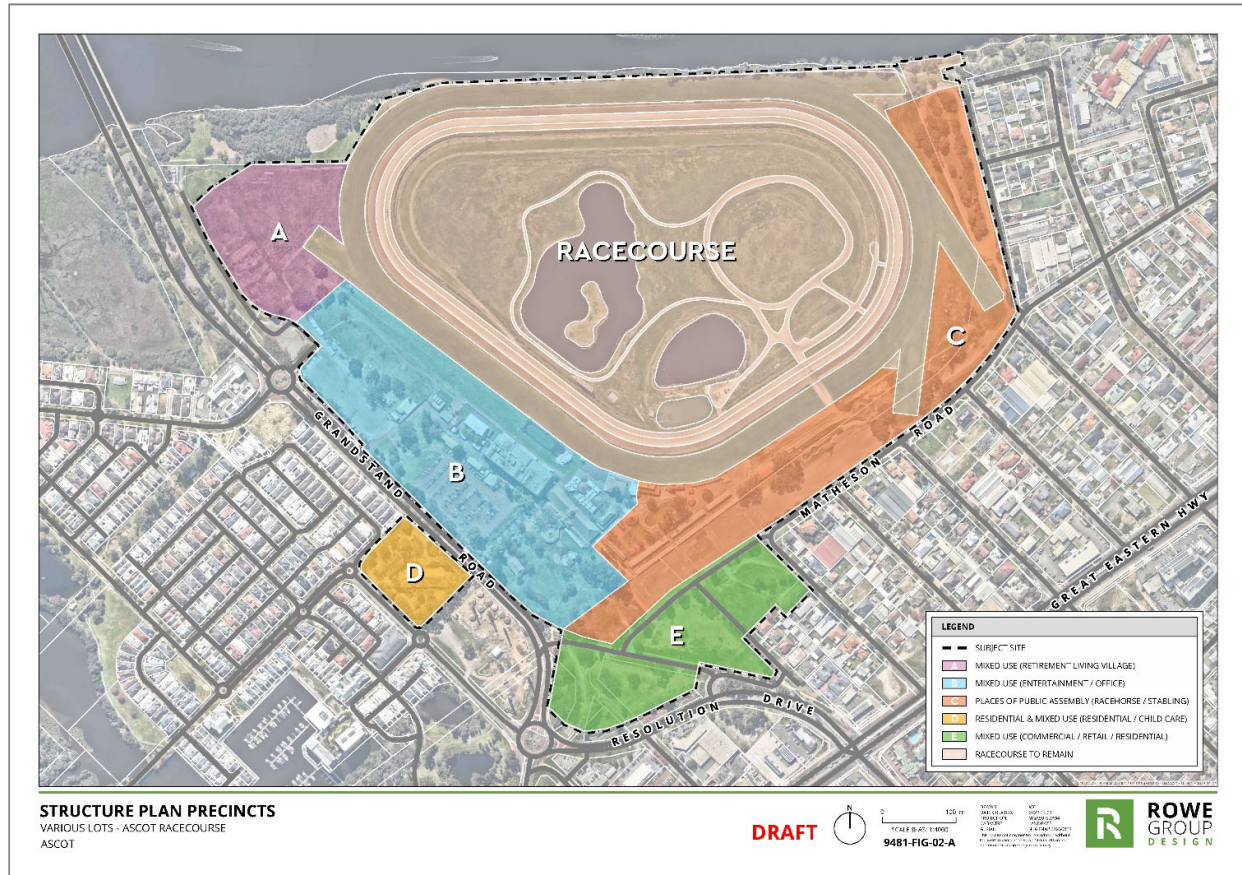


Figure 1-1: Structure Plan Precincts

Appendix B contains a description of some of the terminology used throughout this report.

2. CRITERIA

The criteria relevant to this project is provided in *State Planning Policy No. 5.4 Road and Rail Noise* (hereafter referred to as SPP 5.4) produced by the Western Australian Planning Commission (WAPC). SPP 5.4 is supported by the *Road and Rail Noise Guidelines* (the Guidelines) and the Department of Planning, Lands and Heritage mapping. The objectives of SPP 5.4 are to:

- Protect the community from unreasonable levels of transport noise;
- Protect strategic and other significant freight transport corridors from incompatible urban encroachment;
- Ensure transport infrastructure and land-use can mutually exist within urban corridors;
- Ensure that noise impacts are addressed as early as possible in the planning process; and
- Encourage best practice noise mitigation design and construction standards.

Table 2-1 sets out noise targets that are to be achieved by proposals under which SPP 5.4 applies. Where the targets are exceeded, an assessment is required to determine the likely level of transport noise and management/mitigation required.

Table 2-1: Noise Targets for Noise Sensitive Land-Use

Scenario	Outdoor Noise Target		Indoor Noise Target	
	55 dB L _{Aeq} (Day)	50 dB L _{Aeq} (Night)	40 dB L _{Aeq} (Day) (Living and Work Areas)	35 dB L _{Aeq} (Night) (Bedrooms)
Noise-sensitive land-use and/or development				

Notes:

- Day period is from 6am to 10pm and night period from 10pm to 6am.
- The outdoor noise target is to be measured at 1-metre from the most exposed, habitable¹ facade of a noise sensitive building.
- For all noise-sensitive land-use and/or development, indoor noise targets for other room usages may be reasonably drawn from Table 1 of Australian Standard/New Zealand Standard AS/NZS 2107:2016 *Acoustics – Recommended Design Sound Levels and Reverberation Times for Building Interiors* (as amended) for each relevant time period.
- Outdoor targets are to be met at all outdoor areas as far as is reasonable and practicable to do so using the various noise mitigation measures outlined in the Guidelines.

The application of SPP 5.4 is to consider anticipated traffic volumes for the next 20 years from when the noise assessment has been undertaken.

¹ A habitable room is defined in State Planning Policy 3.1 as a room used for normal domestic activities that includes a bedroom, living room, lounge room, music room, sitting room, television room, kitchen, dining room, sewing room, study, playroom, sunroom, gymnasium, fully enclosed swimming pool or patio.

3. METHODOLOGY

The site is within the trigger distance of Great Eastern Highway, considered to be a 'Strategic Freight/Major Traffic Route' as shown on the PlanWA Maps (refer *Table 1-1* and *Figure 3-1*).

Table 3-1: Transport Corridor Classification and Trigger Distances

Transport Road Classification	Trigger Distance	Distance Measured From
Strategic Freight and Major Traffic Routes Roads as defined by Perth and Peel Planning Frameworks and/or roads with either 500 or more Class 7 to 12 Austroads vehicles per day, and/or 50,000 per day traffic volume	300 metres	Road carriageway edge
Other Significant Freight/Traffic Routes These are generally any State administered road and/or local government road identified as being a future State administered road (red road) and other roads that meets the criteria of either ≥ 100 Class 7 to 12 Austroads vehicles daily or $\geq 23,000$ daily traffic count (averaged equivalent to 25,000 vehicles passenger car units under region schemes)	200 metres	Road carriageway edge



Figure 3-1: Subject Site Locality in Relation to Road (Source: DPLH PlanWA)

The methodology used in this assessment is to follow the screening assessment procedure provided in the Guidelines. From *Table 2* of the Guidelines (refer *Figure 3-2*), noise levels at the proposed site are up to 58 dB LAeq(Day), with Great Eastern Highway being a total of 6 lanes and at its closest point at a distance of 130 metres.

The forecast levels provided in the Guidelines assume open and level ground. The Guidelines allow a 4 dB reduction in noise level where:

- an existing building or structure screens more than 50% of the most exposed part of the noise-sensitive land-use; or
- where a solid continuous minimum 1.8 metre noise wall/fence exists or is proposed; or
- through a combination of permanent structures and terrain so there is no direct line of sight.

In this project, the 4 dB reduction is applicable to the ground floor due to other buildings located between the subject site and road corridor.

Transport Corridor Classification		Number of lanes (both directions), including bus/priority lanes and entrance/exist ramps	Forecast noise exposure category based on lot distance(m) from edge of nearest main road carriageway (not entrance/exist ramps)																							Forecast Excess Noise Level, dB	Exposure Category	Policy requirements for noise-sensitive land-use and/or development
			adjacent	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	175	200	225	250	275	300				
Strategic freight/major traffic route • 500 or more Class 7-12 Austroads vehicles per day, or • 50,000+ vehicles per day	2 to 4 lanes	72	68	66	65	63	62	61	61	60	59	59	58	57	57	56	55	54	53	53	51	50						
	5 to 6 lanes	74	70	68	66	65	64	63	62	61	61	60	59	59	58	58	57	56	55	54	53	52						
	7 to 8 lanes	76	72	69	68	66	65	64	64	63	62	62	61	60	60	59	58	57	56	55	54	53						
	9 to 10 lanes	77	73	70	69	67	66	65	65	64	63	63	62	61	61	60	59	58	57	56	55	54						
	10 or more lanes	78	74	71	70	68	67	66	66	65	64	64	63	62	62	61	60	59	58	57	56	55						
Other significant freight / traffic routes • Any actual or planned future State Administered Road • Local Government Roads Carrying 100 or more Class 7 – 12 Austroads vehicles/day • 25,000+ vehicles per days vehicles/day	Urban Region Scheme areas 60-80 km/hr	1 to 2 lanes	67	64	62	61	60	59	58	57	56	56	55	54	54	53	53	52	51	50	49	48	47					
		3 to 6 lanes	69	66	64	63	62	61	60	59	58	58	57	56	56	55	55	54	53	52	51	50	49					
	Urban Region Scheme areas 100+ km/hr	1 to 2 lanes	70	67	65	64	63	62	61	60	59	59	58	57	57	56	56	55	54	53	52	51	50					
		3 to 6 lanes	74	70	68	66	65	64	63	62	61	61	60	60	59	59	58	57	56	55	54	53	52					
	Rural areas 60-80 km/hr	1 to 2 lanes	62	59	57	56	55	54	53	52	51	51	50	49	49	48	48	46	45	44	43	42	41					
		3 to 4 lanes	66	63	61	60	59	58	56	56	55	54	53	53	52	52	51	50	49	48	47	46	45					
	Rural areas 100+ km/hr	1 to 2 lanes	67	64	62	61	60	59	58	57	56	55	54	54	53	53	52	51	50	49	48	47	46					
		3 to 4 lanes	69	66	64	63	62	61	60	59	58	57	56	56	55	55	54	53	52	51	50	49	48					

* Assists to mitigate short term noise events from freight rail.

Figure 3-2: Noise Exposure Forecast Table from Guidelines

4. RESULTS

The results of the screening assessment are summarised as follows:

- Zone E is within 200 metres of Great Eastern Highway;
- Zone E is mixed use and therefore may have some noise sensitive (residential) uses subject to compliance with SPP 5.4;
- Zone E is no closer than 130 metres to Great Eastern Highway placing parts within Exposure A:
 - Due to the screening effect of existing buildings, any ground floor noise sensitive uses would be compliant with the outdoor noise target; and
 - Noise sensitive uses above ground floor and within 200 metres of Great Eastern Highway would be subject to Package A (refer *Appendix A*), including a notification on title. Alternatives to the Deemed to Comply Package A can be accepted if supported by a report from a suitably qualified acoustical consultant (member firm of the Association of Australasian Acoustical Consultants (AAAC)) once the specific plans are available.



Figure 4-1: Exposure Levels to Upper Floors of Noise Sensitive Buildings

5. CONCLUSION

The objectives of SPP 5.4 are to achieve:

- Indoor noise levels specified in *Table 2-1* in noise-sensitive areas (e.g. bedrooms and living rooms of houses); and
- A reasonable degree of acoustic amenity for outdoor living areas on each residential lot.

Where the outdoor noise targets of *Table 2-1* are achieved, no further noise controls are necessary. Based on the SPP 5.4 screening assessment procedure, any part of the development outside of 200 metres is compliant. Any ground floor noise sensitive development within 200 metres is also compliant.

The only area of potential exceedance, based on the screening assessment procedure of SPP 5.4 are upper residential floors within Zone E where a small area is shown to be in Exposure A. As the Structure Plan develops further, measurements could be undertaken to quantify actual noise levels from Great Eastern Highway, rather than using the screening assessment procedure. Alternatively given the relatively low impact, the screening assessment procedure can be adopted, applying Quiet House Package A to upper floors of noise sensitive dwellings within the marked area on *Figure 4-1*. Alternatives to the Deemed to Comply Package A can be accepted if supported by a report from a suitably qualified acoustical consultant (member firm of the Association of Australasian Acoustical Consultants (AAAC)) once the specific plans are available

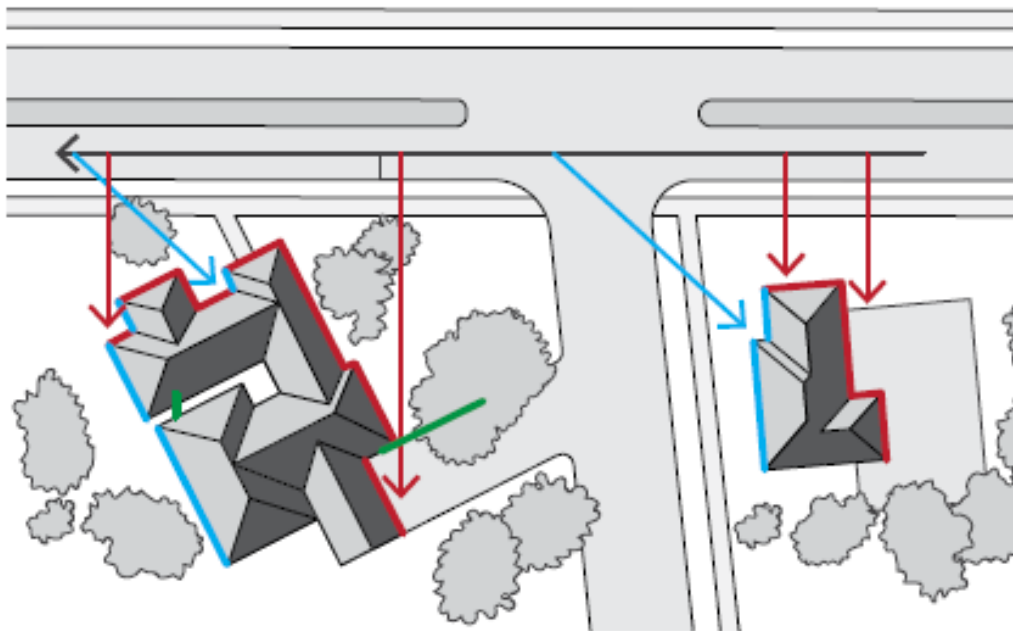
Appendix A – Quiet House Packages

The packages and information provided on the following pages are taken from *Road and Rail Noise Guidelines* (September 2019).

Where outdoor and indoor noise levels received by a noise-sensitive land-use and/or development exceed the policy's noise target, implementation of quiet house requirements is an acceptable solution.

With regards to the packages, the following definitions are provided:

- **Facing** the transport corridor (red): Any part of a building façade is 'facing' the transport corridor if any straight line drawn perpendicular (at a 90 degree angle) to its nearest road lane or railway line intersects that part of the façade without obstruction (ignoring any fence).
- **Side-on** to transport corridor (blue): Any part of a building façade that is not 'facing' is 'side-on' to the transport corridor if any straight line, at any angle, can be drawn from it to intersect the nearest road lane or railway line without obstruction (ignoring any fence).
- **Opposite** to transport corridor (green): Neither 'side on' nor 'facing', as defined above.



Quiet House Package A

56-58 dB $L_{Aeq}(\text{Day})$ & 51-53 dB $L_{Aeq}(\text{Night})$

Element	Orientation	Room	
		Bedroom	Indoor Living and Work Areas
External Windows	Facing	- Up to 40% floor area ($R_w + C_{tr} \geq 28$): - Sliding or double hung with minimum 10mm single or 6mm-12mm-10mm double insulated glazing; - Sealed awning or casement windows with minimum 6mm glass. - Up to 60% floor area ($R_w + C_{tr} \geq 31$): - Sealed awning or casement windows with minimum 6mm glass.	- Up to 40% floor area ($R_w + C_{tr} \geq 25$): - Sliding or double hung with minimum 6mm single or 6mm-12mm-6mm double insulated glazing; - Up to 60% floor area ($R_w + C_{tr} \geq 28$); - Up to 80% floor area ($R_w + C_{tr} \geq 31$).
	Side On	As above, except $R_w + C_{tr}$ values may be 3 dB less or max % area increased by 20%.	
	Opposite	No specific requirements	
External Doors	Facing	Fully glazed hinged door with certified $R_w + C_{tr} \geq 28$ rated door and frame including seals and 6mm glass.	- Doors to achieve $R_w + C_{tr} \geq 25$: 35mm Solid timber core hinged door and frame system certified to $R_w 28$ including seals; - Glazed sliding door with 10mm glass and weather seals.
	Side On	As above, except $R_w + C_{tr}$ values may be 3 dB less.	
	Opposite	No specific requirements	
External Walls	All	$R_w + C_{tr} \geq 45$: - Two leaves of 90mm thick clay brick masonry with minimum 20mm cavity; or - Single leaf of 150mm brick masonry with 13mm cement render on each face; or - One row of 92mm studs at 600mm centres with: - Resilient steel channels fixed to the outside of the studs; and 9.5mm hardboard or fibre cement sheeting or 11mm fibre cement weatherboards fixed to the outside; 75mm thick mineral wool insulation with a density of at least 11kg/m³; and 2 x 16mm fire-rated plasterboard to inside.	
Roofs and Ceilings	All	$R_w + C_{tr} \geq 35$; - Concrete or terracotta tile or metal sheet roof with sarking and at least 10mm plasterboard.	
Outdoor Living Areas		At least one outdoor living area located on the opposite side of the building from the transport corridor or at least one ground level outdoor living area screened using a solid continuous fence or other structure of minimum 2 metres height above ground level.	

Mechanical Ventilation requirements

In implementing the acceptable treatment packages, fresh air requirements of the National Construction Code must be satisfied on the basis of windows closed. Whilst not the only solution, the most common is mechanical ventilation / air-conditioning is installed with the following considerations:

- Acoustically rated openings and ductwork to provide a minimum sound reduction performance of R_w 40 dB into sensitive spaces;
- Evaporative systems require attenuated ceiling air vents to allow closed windows;
- Refrigerant based systems need to be designed to achieve National Construction Code fresh air ventilation requirements;
- Openings such as eaves, vents and air inlets must be acoustically treated, closed or relocated to building sides facing away from the corridor where practicable.

Notification

Notifications on title advise prospective purchasers of the potential for noise impacts from major transport corridors and help with managing expectations.

The Notification is to state as follows:

This lot is in the vicinity of a transport corridor and is affected, or may in the future be affected, by road and rail transport noise. Road and rail transport noise levels may rise or fall over time depending on the type and volume of traffic.

Appendix B – Terminology

The following is an explanation of the terminology used throughout this report:

- **Decibel (dB)**

The decibel is the unit that describes the sound pressure levels of a noise source. It is a logarithmic scale referenced to the threshold of hearing.

- **A-Weighting**

An A-weighted noise level has been filtered in such a way as to represent the way in which the human ear perceives sound. This weighting reflects the fact that the human ear is not as sensitive to lower frequencies as it is to higher frequencies. An A-weighted sound level is described as L_A , dB.

- **L_{eq}**

The L_{eq} level represents the average noise energy during a measurement period.

- **L_1**

The L_1 level represents the noise level exceeded for 1 percent of the measurement period and is considered to represent the average of the maximum noise levels measured.

- **L_{10}**

The L_{10} level represents the noise level exceeded for 10 percent of the measurement period and is considered to represent the “intrusive” noise level.

- **L_{90}**

The L_{90} level represents the noise level exceeded for 90 percent of the measurement period and is considered to represent the “background” noise level.

- **$L_{Aeq(Day)}$**

The $L_{Aeq(Day)}$ level is the logarithmic average of the L_{Aeq} levels from 6.00am to 10.00pm.

- **$L_{Aeq(Night)}$**

The $L_{Aeq(Night)}$ level is the logarithmic average of the L_{Aeq} levels from 10.00pm to 6.00am.

- **$L_{A10,18hour}$**

The $L_{A10,18hour}$ level is the arithmetic average of the hourly L_{A10} levels between 6.00am and midnight.

- **$L_{Aeq,24hour}$**

The $L_{Aeq,24hour}$ level is the logarithmic average of the L_{Aeq} levels from over an entire day.

- **Noise-sensitive land use and/or development**

Land-uses or development occupied or designed for occupation or use for residential purposes (including dwellings, residential buildings or short-stay accommodation), caravan park, camping ground, educational establishment, child care premises, hospital, nursing home, corrective institution or place of worship.

- **R_w**

This is the weighted sound reduction index. It is a single number rating determined by moving a grading curve in integral steps against the laboratory measured transmission loss until the sum of the deficiencies at each one-third-octave band, between 100 Hz and 3.15 kHz, does not exceed 32 dB. The higher the R_w value, the better the acoustic performance.

- **C_{tr}**

This is a spectrum adaptation term for airborne noise and provides a correction to the R_w value to suit source sounds with significant low frequency content such as road traffic or home theatre systems. A wall that provides a relatively high level of low frequency attenuation (i.e. masonry) may have a value in the order of – 4 dB, whilst a wall with relatively poor attenuation at low frequencies (i.e. stud wall) may have a value in the order of -12 dB.

- **About the Term ‘Reasonable’**

An assessment of reasonableness should demonstrate that efforts have been made to resolve conflicts without comprising on the need to protect noise-sensitive land-use activities. For example, have reasonable efforts been made to design, relocate or vegetate a proposed noise barrier to address community concerns about the noise barrier height? Whether a noise mitigation measure is reasonable might include consideration of:

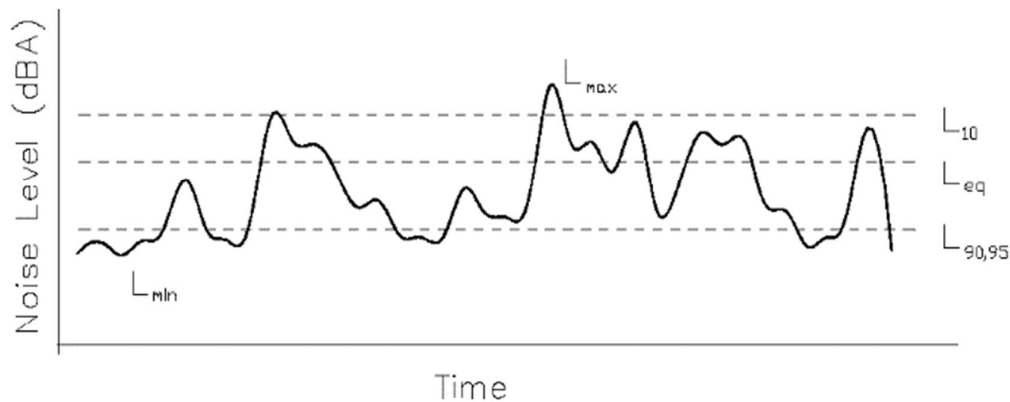
- The noise reduction benefit provided;
- The number of people protected;
- The relative cost vs benefit of mitigation;
- Road conditions (speed and road surface) significantly differ from noise forecast table assumptions;
- Existing and future noise levels, including changes in noise levels;
- Aesthetic amenity and visual impacts;
- Compatibility with other planning policies;
- Differences between metropolitan and regional situations and whether noise modelling requirements reflect the true nature of transport movements;
- Ability and cost for mobilisation and retrieval of noise monitoring equipment in regional areas;
- Differences between Greenfield and infill development;
- Differences between freight routes and public transport routes and urban corridors;
- The impact on the operational capacity of freight routes;
- The benefits arising from the proposed development;
- Existing or planned strategies to mitigate the noise at source.

- **About the Term ‘Practicable’**

‘Practicable’ considerations for the purposes of the policy normally relate to the engineering aspects of the noise mitigation measures under evaluation. It is defined as “reasonably practicable having regard to, among other things, local conditions and circumstances (including costs) and to the current state of technical knowledge” (*Environmental Protection Act 1986*). These may include:

- Limitations of the different mitigation measures to reduce transport noise;
- Competing planning policies and strategies;
- Safety issues (such as impact on crash zones or restrictions on road vision);
- Topography and site constraints (such as space limitations);
- Engineering and drainage requirements;
- Access requirements (for driveways, pedestrian access and the like);
- Maintenance requirements;
- Bushfire resistance or BAL ratings;
- Suitability of the building for acoustic treatments.

- **Chart of Noise Level Descriptors**



• Austroads Vehicle Class

VEHICLE CLASSIFICATION SYSTEM	
AUSTROADS	
CLASS	LIGHT VEHICLES
1	SHORT Car, Van, Wagon, 4WD, UTV, Bicycle, Motorcycle
2	SHORT - TOWING Trailer, Caravan, Boat
HEAVY VEHICLES	
3	TWO AXLE TRUCK OR BUS *2 axle groups
4	THREE AXLE TRUCK OR BUS *3 axles, 2 axle groups
5	FOUR (or FIVE) AXLE TRUCK *4 (5) axles, 2 axle groups
6	THREE AXLE ARTICULATED *3 axles, 3 axle groups
7	FOUR AXLE ARTICULATED *4 axles, 3 or 4 axle groups
8	FIVE AXLE ARTICULATED *5 axles, 3+ axle groups
9	SIX AXLE ARTICULATED *6 axles, 3+ axle groups or 7+ axles, 3 axle groups
LONG VEHICLES AND ROAD TRAINS	
10	8 DOUBLE or HEAVY TRUCK and TRAILER *7+ axles, 4 axle groups
11	DOUBLE ROAD TRAIN *7+ axles, 5 or 6 axle groups
12	TRIPLE ROAD TRAIN *7+ axles, 7+ axle groups

• Typical Noise Levels

