

HERRING STORER ACOUSTICS

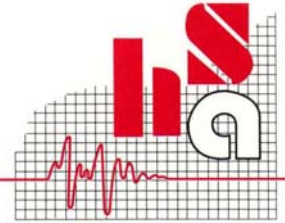
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THE HOUSING AUTHORITY

**LOTS 9001, 570 – 572 & 574 MURDOCH DRIVE
SOUTH HEDLAND**

SPP 5.4 ACOUSTIC ASSESSMENT

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EXECUTIVE SUMMARY

Herring Storer Acoustics was commissioned by the Housing Authority to carry out a rail noise assessment for the proposed residential rezoning, located at Lots 9001, 570, 571, 572 and 574 Murdoch Drive, South Hedland.

The purpose of this study was to assess noise received at future residences within the site from trains travelling on the adjacent railway line and where applicable, comment on possible noise attenuation measures that could control noise intrusion to acceptable levels. The rail noise assessment has been carried out in accordance with the WAPC State Planning Policy 5.4 *"Road and Rail Transportation Noise and Freight Consideration in Land Use Planning"*. We note that under the Planning Policy, the appropriate acoustic criteria would be the "Noise Limits". The assessment was based on the indicative development concept plan for the site.

It is also noted that if noise received at the residences complies with the noise "Target" criteria, under the Policy, nothing further is required.

The noise modelling indicates that without any noise amelioration, noise received at the residences located closest to the railway line would be below the night period "Target" noise level. Therefore, under State Planning Policy 5.4, there are no requirements for this development.

1. INTRODUCTION

Herring Storer Acoustics was commissioned by the Housing Authority to carry out a rail noise assessment for the proposed residential rezoning, located at Lots 9001, 570, 571, 572 and 574 Murdoch Drive, South Hedland. As part of the study, the following was carried out:

- Determine by noise modelling of the noise levels that would be received at residences within the development from trains travelling along the railway line.
- Assess the predicted noise levels received at residence for compliance with the requirements of the WAPC State Planning Policy 5.4 “Road and Rail Transportation Noise and Freight Consideration in Land Use Planning” (SPP 5.4).
- If exceedances are predicted, comment on possible noise amelioration options for compliance with the appropriate criteria.

For information, the local structure plan is attached in Appendix A.

2. CRITERIA

2.1 STATE PLANNING POLICY 5.4

The Western Australian Planning Commission (WAPC) released on 22 September 2009 State Planning Policy 5.4 “Road and Rail Transport Noise and Freight Considerations In Land Use Planning”. Section 5.3 – Noise Criteria, which outlines the acoustic criteria, states:

“5.3 - NOISE CRITERIA

Table 1 sets out the outdoor noise criteria that apply to proposals for new noise-sensitive development or new major roads and railways assessed under this policy.

These criteria do not apply to—

- *proposals for redevelopment of existing major roads or railways, which are dealt with by a separate approach as described in section 5.4.1; and*
- *proposals for new freight handling facilities, for which a separate approach is described in section 5.4.2.*

The outdoor noise criteria set out in Table 1 apply to the emission of road and rail transport noise as received at a noise-sensitive land use. These noise levels apply at the following locations—

- *for new road or rail infrastructure proposals, at 1 m from the most exposed, habitable façade of the building receiving the noise, at ground floor level only; and*
- *for new noise-sensitive development proposals, at 1 m from the most exposed, habitable façade of the proposed building, at each floor level, and within at least one outdoor living area on each residential lot.*

Further information is provided in the guidelines.

Table 1: Outdoor Noise Criteria

Time of day	Noise Target	Noise Limit
Day (6 am–10 pm)	$L_{Aeq(Day)} = 55 \text{ dB(A)}$	$L_{Aeq(Day)} = 60 \text{ dB(A)}$
Night (10 pm–6 am)	$L_{Aeq(Night)} = 50 \text{ dB(A)}$	$L_{Aeq(Night)} = 55 \text{ dB(A)}$

The 5 dB difference between the outdoor noise target and the outdoor noise limit, as prescribed in Table 1, represents an acceptable margin for compliance. In most situations in which either the noise-sensitive land use or the major road or railway already exists, it should be practicable to achieve outdoor noise levels within this acceptable margin. In relation to greenfield sites, however, there is an expectation that the design of the proposal will be consistent with the target ultimately being achieved.

Because the range of noise amelioration measures available for implementation is dependent upon the type of proposal being considered, the application of the noise criteria will vary slightly for each different type. Policy interpretation of the criteria for each type of proposal is outlined in sections 5.3.1 and 5.3.2.

The noise criteria were developed after consideration of road and rail transport noise criteria in Australia and overseas, and after a series of case studies to assess whether the levels were practicable. The noise criteria take into account the considerable body of research into the effects of noise on humans, particularly community annoyance, sleep disturbance, long-term effects on cardiovascular health, effects on children's learning performance, and impacts on vulnerable groups such as children and the elderly. Reference is made to the World Health Organization (WHO) recommendations for noise policies in their publications on community noise and the Night Noise Guidelines for Europe. See the policy guidelines for suggested further reading.

5.3.1 Interpretation and application for noise-sensitive development proposals

In the application of these outdoor noise criteria to new noise-sensitive developments, the objective of this policy is to achieve –

- *acceptable indoor noise levels in noise-sensitive areas (for example, bedrooms and living rooms of houses, and school classrooms); and*
- *a reasonable degree of acoustic amenity in at least one outdoor living area on each residential lot¹.*

If a noise-sensitive development takes place in an area where outdoor noise levels will meet the noise target, no further measures are required under this policy.

In areas where the noise target is likely to be exceeded, but noise levels are likely to be within the 5dB margin, mitigation measures should be implemented by the developer with a view to achieving the target levels in a least one outdoor living area on each residential lot¹. Where indoor spaces are planned to be facing any outdoor area in the margin, noise mitigation measures should be implemented to achieve acceptable indoor noise levels in those spaces. In this case, compliance with this policy can be achieved for residential buildings through implementation of the deemed-to-comply measures detailed in the guidelines.

¹ For non residential noise-sensitive developments, (e.g. schools and child care centres) consideration should be given to providing a suitable outdoor area that achieves the noise target, where this is appropriate to the type of use.

In areas where the outdoor noise limit is likely to be exceeded (i.e. above $L_{Aeq(Day)}$ of 60 dB(A) or $L_{Aeq(Night)}$ of 55 dB(A)), a detailed noise assessment in accordance with the guidelines should be undertaken by the developer. Customised noise mitigation measures should be implemented with a view to achieving the noise target in at least one outdoor living or recreation area on each noise-sensitive lot or, if this is not practicable, within the margin. Where indoor spaces will face outdoor areas that are above the noise limit, mitigation measures should be implemented to achieve acceptable indoor noise levels in those spaces, as specified in the following paragraphs.

For residential buildings, acceptable indoor noise levels are $L_{Aeq(Day)}$ of 40 dB(A) in living and work areas and $L_{Aeq(Night)}$ of 35 dB(A) in bedrooms². For all other noise-sensitive buildings, acceptable indoor noise levels under this policy comprise noise levels that meet the recommended design sound levels in Table 1 of Australian Standard AS 2107:2000 Acoustics—Recommended design sound levels and reverberation times for building interiors.

These requirements also apply in the case of new noise-sensitive developments in the vicinity of a major transport corridor where there is no existing railway or major road (bearing in mind the policy's 15-20 year planning horizon). In these instances, the developer should engage in dialogue with the relevant infrastructure provider to develop a noise management plan to ascertain individual responsibilities, cost sharing arrangements and construction time frame.

If the policy objectives for noise-sensitive developments are not achievable, best practicable measures should be implemented, having regard to section 5.8 and the guidelines."

The Policy, under Section 5.7, also provides the following information regarding "Notifications on Titles":

"5.7 - NOTIFICATION ON TITLE

If the measures outlined previously cannot practicably achieve the target noise levels for new noise-sensitive developments, this should be notified on the certificate of title.

Notifications on certificates of title and/or advice to prospective purchasers advising of the potential for noise impacts from major road and rail corridors can be effective in warning people who are sensitive to the potential impacts of transport noise. Such advice can also bring to the attention of prospective developers the need to reduce the impact of noise through sensitive design and construction of buildings and the location of outdoor living areas.

The notification is to ensure that prospective purchasers are advised of –

- the potential for transport noise impacts; and*
- the potential for quiet house design requirements to minimise noise intrusion through house layout and noise insulation (see the guidelines).*

² For residential buildings, indoor noise levels are not set for utility spaces such as bathrooms. This policy encourages effective "quiet house" design, which positions these non-sensitive spaces to shield the more sensitive spaces from transport noise (see guidelines for further information).

Notification should be provided to prospective purchasers and be required as a condition of subdivision (including strata subdivision) for the purposes of noise-sensitive development as well as planning approval involving noise-sensitive development, where noise levels are forecast or estimated to exceed the target outdoor noise criteria, regardless of proposed noise attenuation measures. The requirement for notification as a condition of subdivision and the land area over which the notification requirement applies, should be identified in the noise management plan in accordance with the guidelines.

An example of a standard form of wording for notifications is presented in the guidelines.”

2.2 APPROPRIATE CRITERIA

Based on the above, the following criteria are proposed for this development:

External

Day	Maximum of 60 dB(A) L_{Aeq}
Night	Maximum of 55 dB(A) L_{Aeq}

Internal

Sleeping Areas	35 dB(A) $L_{Aeq(night)}$
Living Areas	40 dB(A) $L_{Aeq(day)}$

Additional to these criteria, noise received at an outdoor area, where practicable, should also achieve an L_{Aeq} of 50 dB(A) during the night period.

3. MEASUREMENTS

As part of a previous assessment, noise level measurements of train movements on the railway line were undertaken. From these measurements, the noise level of a passing train has been determined to be an $L_{Aeq(2min)}$ of 74 dB(A) at a distance of 25 metres from the line.

4. MODELLING

Noise modelling was undertaken using the “SoundPlan” noise modelling program. The noise model was calibrated to the noise level listed above in Section 3 – Measurements.

From previous assessments, we understand that currently there are around 30 train movements per day on this railway line. However, we understand that in the future, the number of train movements could increase to 60 movements per day. Therefore, the results of the noise modelling was adjusted for this increase in train movements.

Other input data for the model included:

- Topographical data, with the ground levels obtained from Google Earth; and
- A +2.5 dB adjustment to allow for façade reflection.

We note that we have assumed that the number of train movements would be consistent during both the day and night periods. Thus for this development, the night period is the critical period for compliance.

Noise modelling was undertaken without any noise amelioration.

Based on the above, the noise received at the closest possible residence within the future subdivision from future train movements and including the +2.5dB(A) façade correction has been determined to be an $L_{Aeq(8hr)}$ of 44 dB(A).

5. DISCUSSION / RECOMMENDATION

Under the WAPC State Planning Policy 5.4, for this development, the "Noise Limits" as listed in Table 1 are the appropriate noise levels for to be achieved for this development. Under The SPP 5.4, the noise "Limit" criteria which are applicable external to a residence are:

External (Limit)

Day	Maximum of 60 dB(A) L_{Aeq}
Night	Maximum of 55 dB(A) L_{Aeq}

The policy states that the outdoor criteria applies to the ground floor level only, however, it also states that noise mitigation measures should be implemented with a view to achieving the "Noise Target" levels in least one outdoor living area.

It is also noted that if noise received at the residence complies with the "Target" noise levels, then no further action is required. The noise "Target" criteria are:

External (Target)

Day	55 dB(A) L_{Aeq}
Night	50 dB(A) L_{Aeq}

We note that with the assumption of train movement being consistent during both the day and night periods, the noise received at residence located adjacent to the railway line is the same for both the day and night periods. Thus for this development, the night period is the critical period for compliance.

The modelling indicates that noise received at the closest residence to the railway line would, during the night period comply with the "Target" noise level. Hence, under the Policy nothing further is required.

APPENDIX A

INDICATIVE DEVELOPMENT CONCEPT PLAN



Indicative Concept Plan
Lots 9001, 570-572 and 574, Murdoch Drive, South Headland
For Department of Housing - July 2015