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AGED CARE FACILITY FEASIBILITY STUDY

OATLEY BOWLING CLUB, OATLEY

TRAIN NOISE AND VIBRATION ASSESSMENT

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1. INTRODUCTION

Feasibility study has been undertaken of the impact of train noise and vibration on the acoustic amenity of site for future development. The following noise sources have been assessed:

- Illawarra Line rail corridor.
- South Coast Line rail corridor

Rail traffic noise levels at the site have been measured and assessed in accordance with the requirements of the local council.

2. SITE DESCRIPTION

The proposed site is located at River Road, Oatley adjacent to the railway line and approximately 50 metres from Oatley Railway Station. It has an area of 11,100m^2 comprising Lots 14-20 of DP 7124, part of River Road, Mytle Street, and Lots 3-7 of DP7124.

3. RAIL TRAFFIC NOISE

3.1 PROJECT NOISE OBJECTIVES

Council requires that rail noise located adjacent to train lines must be assessed in accordance with the Rail Infrastructure Corporation (RIC) and State Rail Authority (SRA) requirements. RIC and SRA in their publication 'Interim Guidelines for Councils – Consideration of Rail Noise and Vibration in the Planning Process' dated 2003 nominate criteria for residential units which are assessed internally with windows closed. These are detailed in Table 1 below.

Table 1 – Internal Railway Noise Level Criteria

Location	Time of Day	$L_{Aeq,1hr}$ dB(A)
Living and sleeping areas	Day (7am-10pm)	40
	Night (10pm-7am)	35

3.2 RAIL TRAFFIC NOISE MEASUREMENTS

Measurements were performed generally in accordance with the Australian Standard AS 1055 - "Description and measurement of environmental noise - General Procedures".

3.2.1 Measurement Locations

Rail noise measurements were conducted at 5 meters distance from rail corridor boundary fence.

3.2.2 Time of Measurements

Manned measurements were conducted on 15 February 2007 between 2:30pm and 4pm.

3.2.3 Measurement Equipment

A Norsonic Type SA118 Sound Analyser was used for the noise measurements. The analyser was set to fast response and calibrated before and after the measurements using a Norsonic Sound Calibrator Type 1251. No significant drift was noted.

3.2.4 Measured Noise Levels

The external noise levels from measurements conducted on site are detailed in Table 2 below.

Table 2 –External Noise Levels

Location	Day Noise Level $L_{Aeq,1hr}$ dB(A)	Night Noise Level $L_{Aeq,1hr}$ dB(A)
5m from rail corridor boundary fence	66	63

3.3 EVALUATION OF NOISE INTRUSION

Noise intrusion into the apartments was assessed using the measured levels in Section 3.2.4. Since detailed floor plans for the proposed building have not been completed the assessment is based on assumption of the similar projects carried out by this office.

Calculations were performed taking into account the orientation of windows, barrier effects (where applicable), roof, the total area of glazing, facade transmission loss and room sound absorption characteristics. In this way the likely interior noise levels can be predicted.

In all cases, the use of single updated acoustic glazing will reduce internal noise levels to within the nominated criteria for the various space types. A detailed study would be undertaken as part of DA approve once the building sitting and appropriate layouts are finalised.

3.3.1 Entry doors

Apartment entry doors will require no additional acoustic treatment.

3.3.2 Roof/ ceiling constructions

The indicative roof/ceiling construction shall be minimum one layer of 16mm plasterboard for habitable spaces along the eastern façade with 75mm thick 11kg/m3 glasswool insulation above.

3.3.3 External Walls

External masonry wall elements will be acoustically satisfactory for rail traffic noise intrusion.

4. VENTILATION

As the recommended internal noise levels cannot be achieved with windows open for eastern façade an alternative outside air supply system or air conditioning system will be required to be installed in accordance with RIC and SRA requirements.

The alternative ventilation system that is installed should be acoustically designed to ensure that the acoustic performance of the recommended constructions is not reduced and provide ventilation complying with the BCA with windows closed.

5. RAIL TRAFFIC VIBRATION

Trains induce ground borne vibration that is transmitted through the subsoil. This vibration can be perceptible close to railways.

5.1 PROJECT VIBRATION OBJECTIVES

The RIC's and SRA's Interim Guidelines recommend that habitable rooms should comply with the criteria in British Standard BS 6472:1992 "Evaluation of Human Exposure to Vibration in Buildings (1Hz to 80Hz)".

British Standard BS 6472:1992 "Evaluation of Human Exposure to Vibration in Buildings (1Hz to 80Hz)" is recommended by the RIC's and SRA's Interim Guidelines for Councils "Consideration of rail noise and vibration in the planning process" as this standard includes guidance for the assessment of human response to building vibration including intermittent vibrations such as that caused by trains.

Human response to vibration has been shown to be biased at particular frequencies, which are related to the orientation of the person. This standard provides curves of equal annoyance for various orientations. These curves are applied as correction filters such that an overall weighted acceleration level is obtained. As the orientation of the resident is unknown or varying the weighting filter used is based on the combined base curve as given in ISO 2631 & Australian Standard 2670 "Evaluation of Human Exposure to Vibration and Shock in

Buildings (1 to 80Hz)" which represents the worst case of the X, Y and Z axes. Filtered measurements are made in all three co-ordinate axes and the highest value axis used.

This standard assesses the annoyance of intermittent vibration by using the Vibration Dose Value (VDV). Alternatively the VDV may be estimated by the eVDV which is derived by a simpler calculation using an empirical factor. The VDV or eVDV is calculated for the two periods of the day being the "Daytime" (6am-10pm) and "Night time" (10pm-6am). The overall value is then compared to the levels in Table 3. For this project the aim will be for a low probability of adverse comment.

Table 3 – Vibration Dose Values ($m/s^{1.75}$) above which various degrees of adverse comment may be expected in residential buildings.

Place	Low Probability of adverse comment	Adverse comment possible	Adverse comment probable
Residential buildings 16hr day	0.2 to 0.4	0.4 to 0.8	0.8 to 1.6
Residential buildings 8hr night	0.13	0.26	0.51

5.2 DISCUSSION

According RIC requirements, if the nearest residential façade located more than 60m away from the rail corridor, no train vibration assessment is required.

No floor plans available for the proposed development at this stage. Train vibration will be measured and all the results will be compared with the vibration criteria above as part of DA. Based on experience with other sites in the general vicinity of the project site, vibration levels within the buildings at appropriate setback will full comply with criteria above without any treatment.

6. CONCLUSION

This report provides the results of feasibility study of train noise intrusion into the proposed aged care facility at Oatley Bowling Club, Oatley.

Noise levels at the site have been measured and assessed in accordance with the requirements of Rail Infrastructure Corporation requirements. The assessment indicated with upgraded single glazing and basic treatment to the building roof façade would result in full compliance with the nominated criteria.

Train vibration objective has been set in this report and detailed vibration assessment will be carried out as part of DA.

We trust this information is satisfactory. Please contact us should you have any further queries.

Report prepared by,

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