30 April 2018

Laminata Outdoor Ltd

Attn: Isaac Lindesay

isaac@laminata.nz

Dear Isaac

LAMINATA FENCING - ACOUSTIC RATING

1. INTRODUCTION

Earcon has been engaged to undertake a review of the acoustic performance of the Laminata Fencing. The review is based on the installation manual dated 16 October 2017.

2. DESIGN CRITERIA

The New Zealand Standards and NZTA proposes several design requirements pertaining to acoustic mitigation, including acoustic fencing. The NZTA recommendations generally refer back to the NZS 6802, as well as other factors and recommendations useful in assessing noise effects associated with road traffic and the effect of fencing. This assessment also takes into account the NZ standard 6806 in regards to road noise mitigation.

NZS6806:2010 Acoustics – Road-traffic noise – New and altered roads

Section 8.2.2 Where the need for noise mitigation measures has been identified, structural mitigation should only be implemented if the combination of the structural mitigation measures used would achieve the following:

- *(a) An average reduction of at least 3dB $L_{Aeq(24h)}$ at the relevant assessment positions of all PPF's (Protected premises and facilities) that are part of a cluster;*
- *(b) A minimum reduction of 5dB $L_{Aeq(24h)}$ at any assessment position(s) for each PPF that is not part of a cluster.*

Level 27, PWC Tower - 188 Quay St – Auckland 1010 PO Box 301561 Albany - North Shore City - Auckland 0752
Tel: 09 443 6410 **Fax:** 09 443 6415 **Mob:** 021 437893

And;

Appending B Table B1 specifies:

The effectiveness of a barrier will depend on its density, height, length, and location. Noise barriers are more cost-effective when they are used for reducing noise received at a group of receivers (cluster) rather than when they are used for reducing the noise received at a single receiver.

To ensure adequate 'transmission loss', noise barriers should generally be constructed of materials that have a surface density of at least 10kg/m2 and build with no gaps to allow sound transmission. Suitable materials include concrete, fibre-cement board, steel, and wood.

3. CONSTRUCTION DETAILS

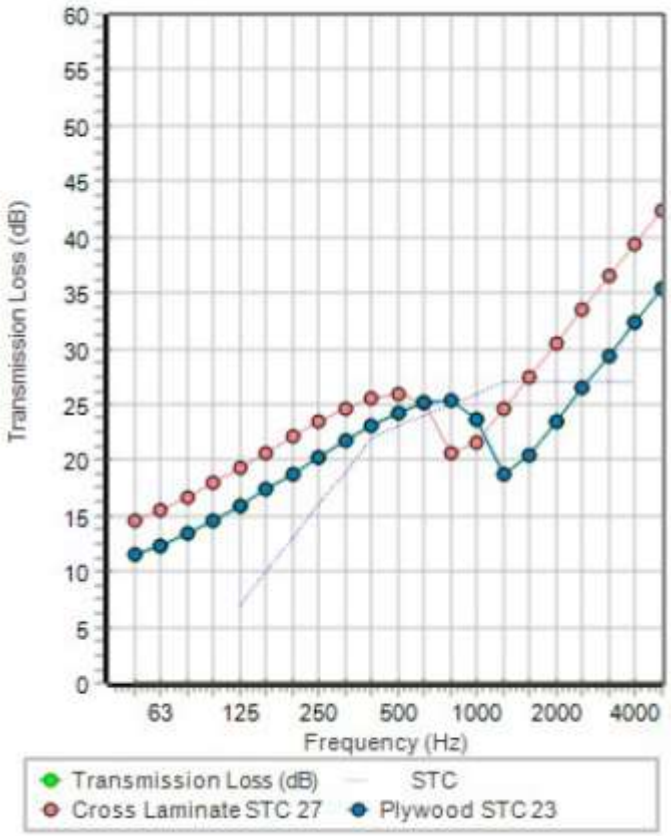
3.1 Construction Material – Cross Laminated Timber

The proposed construction material is cross laminated timber panels measuring 275mm high x 30mm thick and 1800mm long with tongue and grove detail allowing an acoustically effective seal between the panels. The cross laminated timbre material is a radiata pine, with a density of 15.1 kg/m2.

Relative to a similar typical acoustic fencing material, e.g. 18mm plywood panels, the proposed construction material provides a transmission loss generally higher with the exception of the 800 Hz and 1000 Hz third octave bands where the cross laminated timbre fencing performs 5 and 2db less at these frequencies respectively. Nevertheless, the overall transmission is more than 20dB at these frequencies and over 15dB over the relevant spectrum. The resulting noise levels from use of this material will be dominated by the diffracted noise around the acoustic fencing.

Figure 1: Transmission Loss of Cross Laminated 30mm Panel Relative to 18mm Plywood Panel

frequency (Hz)	TL(dB)	TL(dB)
50	12	
63	12	12
80	13	
100	15	
125	16	16
160	17	
200	19	
250	20	20
315	22	
400	23	
500	24	24
630	25	
800	25	
1000	24	22
1250	19	
1600	20	
2000	23	23
2500	26	
3150	29	
4000	32	32
5000	35	



Level 27, PWC Tower - 188 Quay St – Auckland 1010
PO Box 301561 Albany - North Shore City - Auckland 0752
Tel: 09 443 6410 **Fax:** 09 443 6415 **Mob:** 021 437893

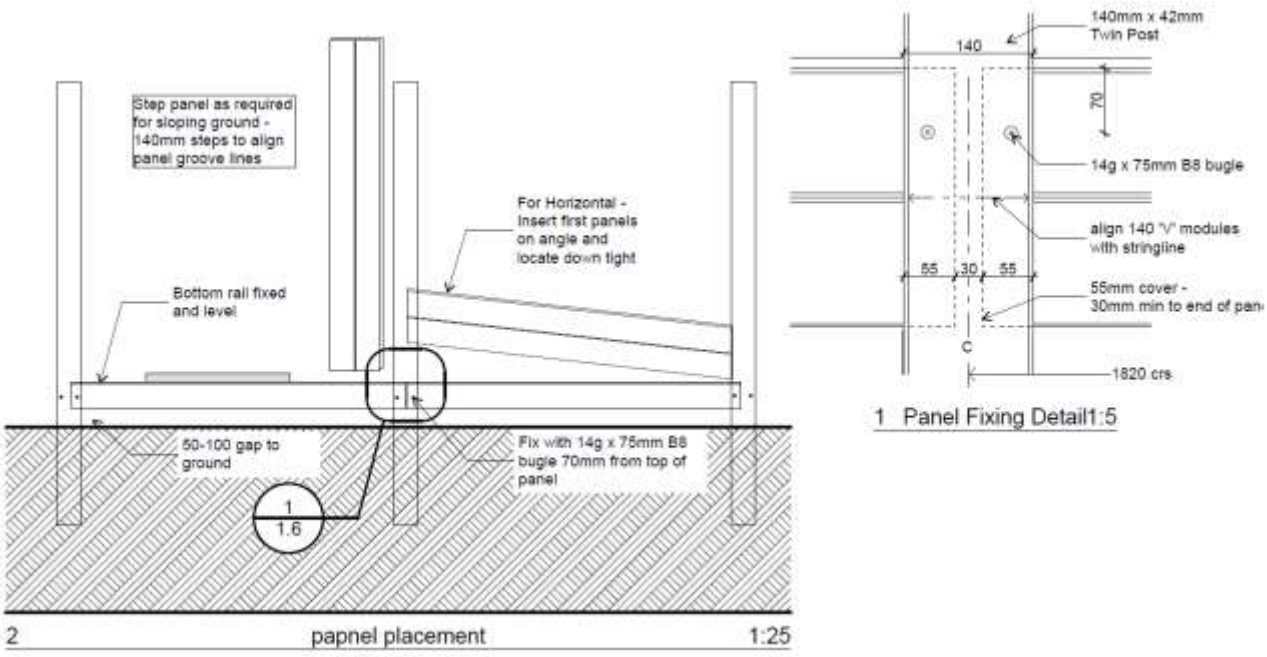
3.2 Construction Detail – Fencing Assembly

The proposed fencing will consist of twin posts providing a channel for the cross laminated timber fencing panels. The tongue and grove fencing panels are proposed to include a base board with 50 – 100 mm gap to the ground, see figure 2 below. This construction detail will result in up to a 3dB degradation to the effectiveness of the acoustic mitigation.

The acoustic fencing height is indicated in the installation manual of 1820mm high and 1970mm high for horizontal panel and vertical panel constructions respectively. This may provide up to a 4 to 5dB (7 to 8dB without gap at based of the fence) reduction respectively. We note that this estimate is based on a flat environment with source and receiver in relatively close proximity to the acoustic fencing. The fencing performance is dependent on several factors unique to each site, including but not limited to topography of the site, relative distance from source and receiver, length and height of fencing, etc.

The overall performance of the proposed construction, with no more than a 100mm gap at the base, will meet the 3dB LAeq(24h) reduction with either construction and meet the 5dB LAeq(24h) reduction with the 1970mm high, vertical panel construction.

Figure 2: Fencing Installation Detail



4. CONCLUSION

The cross laminated timbre panel fencing construction material is suitable for producing acoustic fencing exceeding the recommended minimum density of 10 kg/m2.

The proposed fencing construction detail includes a base gap of up to 100mm. whilst not recommended from an acoustic perspective, the reduction in performance may remain within acceptable limits, relative to the recommended reduction of traffic noise specified in the NZS6806:2010. This may be required to be confirmed on a case by case basis. This degradation may be offset with increasing the fencing height, subject to engineering restrictions.