



20 February 2009

Ref: 09456/2977

Moody & Doyle Town Planning

First floor, Suite 102
25-29 Berry Street
North Sydney, NSW 2060

RE: NOISE ASSESSMENT – CHESTER HILL MATERIALS RECYCLING FACILITY

This report presents the results and findings of a noise impact assessment of proposed modifications to the approved materials recycling facility at 191 Miller Road Chester Hill, NSW.

APPROVED DEVELOPMENT

Information provided by MD Planning in relation to the project has been reviewed in order to determine the scope of the approved development and the aspects of the Modification Application that may require further acoustical assessment in order to enable a determination of the application.

Our understanding of the main points of the approved development is as follows:

- Approval was granted on 27 February 2007 for the processing of ferrous and non-ferrous metals only;
- The approval allows the facility to receive up to 100,000 tonnes of metals annually;
- The initial acoustic assessment by Noise and Sound Services (NSS) considered the use of on-site metal shearing/handling/loading equipment and all off-site traffic impacts;
- The NSS report recommended the installation of acoustic barriers to achieve compliance at nearby residential and industrial receivers; and
- The calculation methodology used by NSS was based on the International Standard ISO 9613-2 (1996) to predict noise levels at individual receivers.

The main points of the proposed modification relevant to acoustics are:

- Receipt and processing of building demolition materials comprising concrete, timber, bricks, tiles, rubber and metals; and
- No increase to the approved 100,000 tonnes per annum materials received.

ASSESSMENT REQUIREMENTS

Based on the above understanding of the approved development and proposed modification, the acoustic assessment was conducted on the following assumptions:

- Additional equipment will be required to crush the concrete/masonry, mulch the timber and screen the topsoil; and
- No additional background monitoring, setting of noise criteria or assessment of off-site traffic noise will be required.

NOISE CRITERIA

The NSS report established the following project-specific noise levels (PSNL):

Location	Intrusive Criterion	Modifying factor (Impulsive)	PSNL
Waldron Road:	47	-5	42
Orchard Road:	50	-5	45
Industries:	70	0	70

ASSESSMENT PROCEDURE

Noise measurements of concrete crushers, timber mulchers and various screens have previously been taken by Spectrum Acoustics using IEC Type 1 Bruel & Kjaer 2260 and 2250 spectrum analysers for similar projects. These data are summarised in **Table 1** and were used as noise sources in the current assessment, as well as all noise sources used by NSS in the original assessment. Octave band values are in dB (linear) and the total is A-weighted.

TABLE 1 Additional noise source sound power levels – dB(A),L _w									
Source	dB(A)	63	125	250	500	1k	2k	4k	8k
Concrete crusher	114	115	117	111	111	109	106	102	95
Timber mulcher	110	113	113	107	105	105	103	101	96
Shaker screen	101	98	100	99	98	96	93	91	88

The Environmental Noise Model (ENM v3.06) was been used to generate contours of equal noise level at 5 dB intervals around the project site. Initial modelling without acoustic barriers resulted in excessive noise levels at all residential and industrial receivers. Barriers were placed in the model at the same locations as the barriers in the NSS noise assessment and the heights were varied until optimal barrier heights were achieved. Saturation of the barrier insertion loss (24 dB) was achieved for a barrier height of 8m, so this was the maximum barrier height that could be used.

Noise source locations were also varied to achieve the greatest noise reduction from the barriers. Mobile sources (excavators and forklifts) were generally scattered throughout the site and stationary sources (metal shearer, concrete crusher and timber mulcher) were placed 6m from the acoustic barriers. Noise source locations and optimised barrier heights and locations are shown in **Figure 1**.

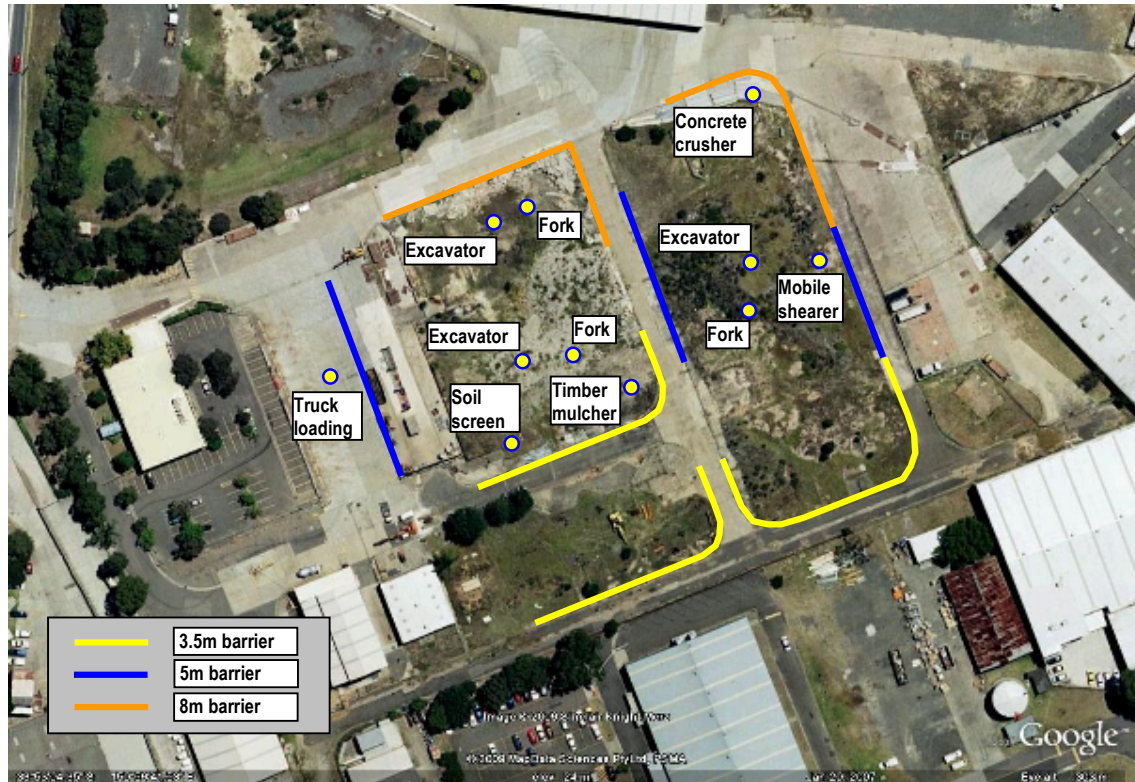


Figure 1. Noise source and acoustic barrier locations.

RESULTS AND DISCUSSION

Noise modelling was conducted under a moderate temperature inversion of $4^{\circ}\text{C}/100\text{m}$. Since inversion effects are omni-directional, the results represent downwind noise levels under a breeze from any direction. Noise contours for the sources/barriers in Figure 1 under inversion conditions are shown in **Figure 2**.

The 45 dB(A) PSNL is generally achieved at the northern end of Orchard Road, with 1-3 dB exceedances further to the south where there are no industrial building obstruction the line of sight to the project site.

An analysis of point-calculation results showed that the loudest individual source was the concrete crusher (45 dB(A)) with the remaining sources contributing a total of up to 45 dB(A). The PSNL of 45 dB(A) included a 5dB tonality 'penalty' for metal impacts, without which the criterion would be 50 dB(A) at these receivers. The concrete crusher measured by Spectrum Acoustics was reasonably constant in its noise emissions and would not attract a 5dB penalty. Since the total noise emissions are dominated by the concrete crusher, it is reasonable that a 50 dB(A) criterion should apply at these receivers and therefore the predicted noise levels comply.

Predicted noise levels of 45 dB(A) at the Waldron Rd residential apartments at the top-right of Figure 2 are for fourth floor receivers. The predicted level is 41 dB(A) at ground floor receivers. The predicted

level at fourth floor level is 3dB above the 'impulsive-corrected' PSNL and 2 dB below the unadjusted intrusiveness criterion. Again, the concrete crusher is the major noise source and compliance with the 47 dB(A) intrusiveness criterion is achieved.



Figure 2. Predicted noise levels under a 4°C/100m temperature inversion.

The facade of the Waldron Road residences are 22m from the Main Southern Railway and train pass-by noise levels above 80 dB(A) will be regularly experienced and ambient L_{Aeq} levels (as measured by NSS) are consistently in the high-50's dB range. It is likely that noise control has been incorporated in the design of these apartments. It is also evident that there is no external recreational space (ie, a back yard) at the apartments and the noise criteria, which aim to maintain residential amenity outside dwellings, do not apply. In the context of the general acoustic environment, it is unlikely that a daytime-only noise level of 42-45 dB(A) (depending on whether the concrete crusher is operating) would constitute a potential noise nuisance.

Figure 2 also shows that the 70 dB(A) contours is wholly contained within the project site, satisfying the noise criterion at adjacent industrial receivers.

In summary, the predicted noise levels have been found to comply with the original intrusiveness criteria (without the tonality correction) provided the noise barriers as shown in Figure 1 are incorporated into the project design.

We trust this report fulfils your requirements at this time, however, should you require additional information or assistance please contact the undersigned.

Yours faithfully

SPECTRUM ACOUSTICS PTY LIMITED



Neil Pennington
B.Sc., B.Math(Hons), MAAS, MASA
Acoustical Consultant