1 GORDON AVENUE WILL BE SEVERELY AFFECTED

Compliance with the ground-borne vibration design objectives (and the human comfort vibration criteria from *Assessing Vibration: a technical guideline* – DEC, 2006) is predicted for all receivers located above or near to the proposed tunnel alignment.

Surface track ground-borne vibration

Some residential buildings located immediately adjacent to the surface rail track between Chatswood Station and Chatswood dive may experience an increase in train passby vibration levels. Residential receivers located on the western side of the rail corridor between Mowbray Road and Gordon Avenue, Chatswood are currently around 11 metres from the closest rail track. As a result of the realignment of the T1 North Shore Line, the surface track would be located around eight metres from these receivers (three metres closer). Based on previous investigations of vibration propagation from rail lines undertaken by the US Federal Transit Administration (2006), this change would equate to a potential increase in vibration level of around 2 dB. This increase is expected to be barely noticeable to the receivers.

Ground-borne noise predictions

Predictions of ground-borne noise levels are provided in Figure 11-3 for residential receivers and Figure 11-4 for commercial and other sensitive receivers. The predictions are based on a 'best estimate' plus a 5 dB safety factor. On average, the predicted ground-borne noise levels (for the highest 1 in 20 trains) at the nearest receivers would be around 30 dB which is well below the ground-borne noise design objectives. At most locations the noise levels would be much lower.

The proposed ground-borne noise levels are predicted to comply with the ground-borne noise objectives at all residential, commercial and other sensitive receiver locations.

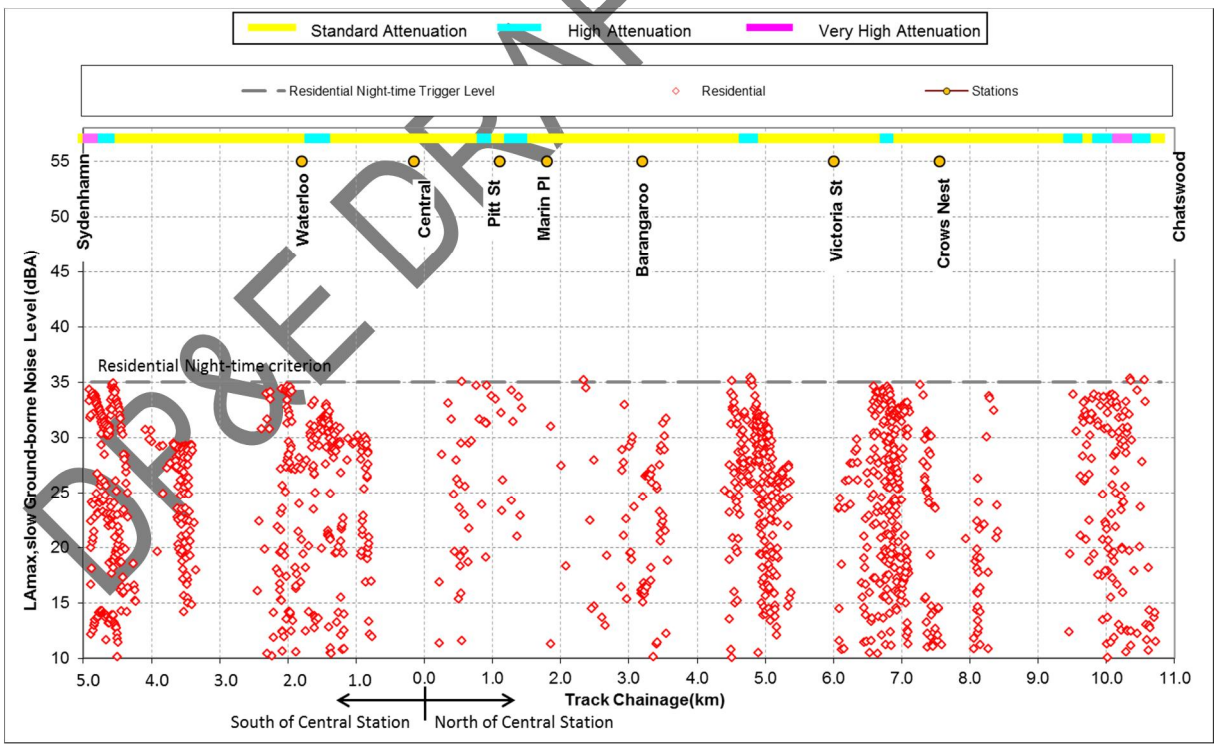

Figure 11-3 Predicted ground-borne noise levels – residential receivers

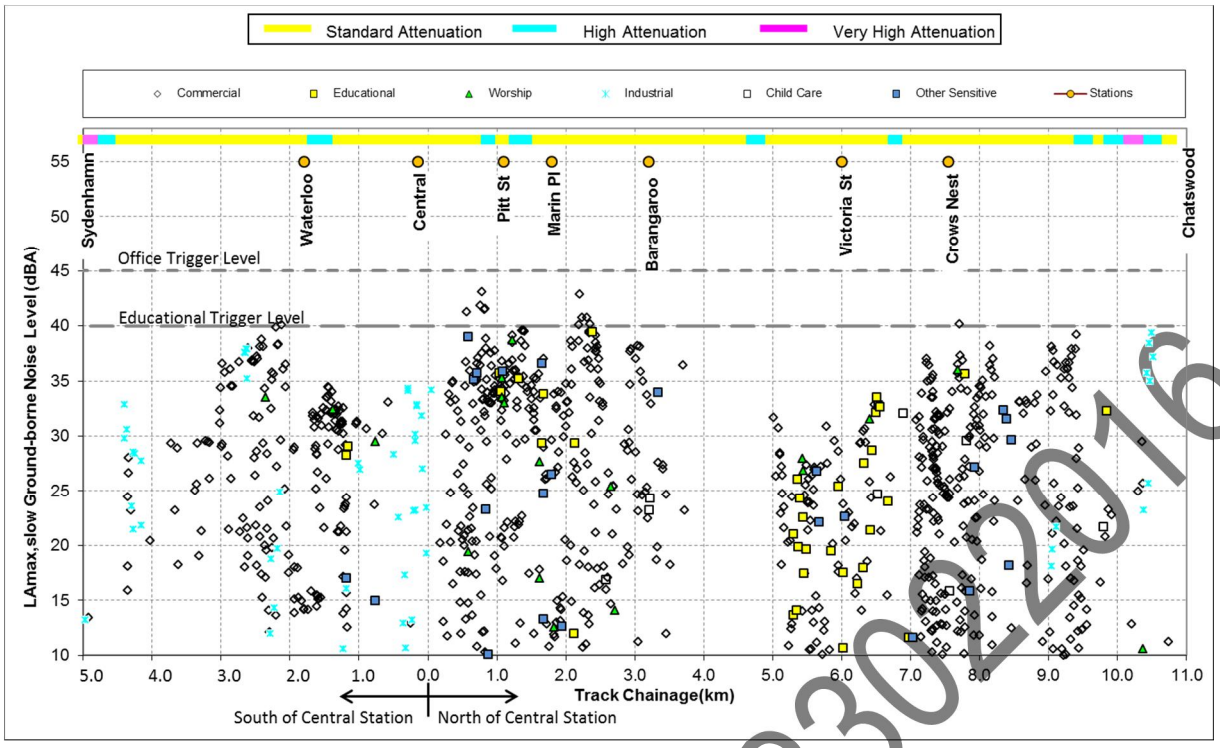

Figure 11-4 Predicted ground-borne noise levels – commercial and other sensitive receivers

11.4.2 Airborne noise

An operational airborne noise assessment has been carried out for the surface track sections at either end of the project, being:

- At the northern end of the project – metro trains operating between Chatswood Station and the Chatswood tunnel portal, and Sydney Trains trains operating on the realigned T1 North Shore Line between Chatswood Station and Brand Street, Artarmon
- At the southern end of the project – metro trains operating in the Marrickville dive structure.

For the purposes of assessment, receivers are broken into a number of noise catchment areas (NCAs). NCAs are determined to reflect the changing land uses and ambient noise environments adjacent to the project.

Northern surface works

In order to mitigate potential airborne noise impacts at the northern end of the project, the design has incorporated the following measures:

- An increase in the height (to four metres) of the noise barrier between Chapman Avenue and Nelson Street on the eastern side of the rail line
- An increase in the height (to four metres) of the noise barrier between the Frank Channon Walk pedestrian underpass and Albert Avenue on the western side the rail line
- An increase in the height (to four metres) of the noise barrier between Nelson Street and Gordon Avenue on the western side the rail line
- A two metre high noise barrier to the south of the Mowbray Road on the western side of the rail line

- Rail dampers and deck absorption within the Chatswood dive structure.

The exact height and extent of the noise walls in these locations would be further refined during detailed design.

A summary of the predicted worst-case noise levels for residential receivers for the 2034 (future year) scenario are presented in Table 11-11. The future year 2034 scenario has been presented as it results in the highest noise level predictions. Results for the at opening 2024 scenario are provided in *Technical paper 2 – Nosie and vibration.*

Table 11-11 Predicted 2034 airborne noise levels – residential receivers Chatswood dive

NCA	Side	Worst-case predicted noise level (dBA)								
		Without project			With project			Increase		RING triggers
		$L_{Aeq(15h)}$	$L_{Aeq(9h)}$	L_{Amax}	$L_{Aeq(15h)}$	$L_{Aeq(9h)}$	L_{Amax}	L_{Aeq}	L_{Amax}	
01	Up	50	46	68	52	47	68	1.6	-0.1	0
	Down	61	58	80	63	58	81	1.2	0.5	0
02	Up	**68**	**64**	**86**	**70**	**65**	**86**	1.9	-0.3	0
	Down	64	60	84	**67**	**62**	**85**	0	1.3	1
03	Up	**69**	**65**	**88**	**68**	**64**	**87**	0.7	0.8	0
	Down	63	59	81	65	60	81	1.8	0.7	0
04	Up	**69**	**65**	**87**	**69**	**65**	**87**	0.3	0	0
	Down	**68**	**64**	**85**	**68**	**64**	**85**	0.1	0	0

Note 1: Red bold indicates an exceedance of criteria

Note 2: For reference the trigger levels are:
development increases existing $L_{Aeq(period)}$ rail noise levels by 2 dB or more, or existing L_{Amax} rail noise levels by 3 dB or more and
predicted rail noise levels exceed: daytime: 65 $L_{Aeq(15hour)}$ or 85 L_{Amax}, night-time: 60 $L_{Aeq(9hour)}$ or 85 L_{Amax}.

The results indicate that noise levels at residential receivers without the project are generally already close to, or exceeding, the overall noise criteria levels.

1-3 GORDON AVENUE WILL BE PENALISED

Comparing the 'with project' and 'without project' noise levels indicates that there is generally no change in noise levels from the project, primarily due to the measures incorporated into the design to minimise operational airborne noise impacts.

From the results it can be seen that there remains a predicted exceedance of the noise trigger levels at one residential receiver building (at address 1-3 Gordon Avenue, Chatswood) on the western side of the rail line. This residential receiver is a multi-storey apartment building and would consist of several dwellings. The upper floors of this receiver would have an unobstructed view of the rail tracks over the noise barrier, even with the proposed increase in barrier height. To break line of sight at the triggered receivers on the upper floor of this building would require a noise barrier in excess of six metres high. Noise barriers of this height are unlikely to be considered reasonable and may not be feasible, particularly since the barrier would need to be located in close proximity to the building facade. Based on the outcomes of noise modelling during detailed design, this property would be considered for at property treatment.

A summary of the predicted worst-case noise levels for other sensitive receivers for the 2034 (future year) scenario are presented in Table 11-12. The future year 2034 scenario has been presented as it results in the highest noise level predictions. Results for the at opening 2024 scenario are provided in *Technical paper 2 – Nosie and vibration.*

THE REPORT ACKNOWLEDGES THAT THEY CANT PROVIDE ADEQUATE SOUND BARRIERS FOR 1-3 GORDON AVENUE.