Rail Airborne Noise Assessment

Rail Noise Impact Assessment Methodology

A.1.1.1.1 Railway noise impact is predicted according to "Calculation of Railway Noise (1995)" (CRN) by the UK Department of Transport. A summary of correction factors are given in the following table:

Table A1.1 Summary of correction factors

Parameters	Assumptions	Remarks
Rail deterioration	3 dB(A)	In-situ rail noise source term measurement near potential development areas at Tung Chung East was conducted at Ta Tang Po and thus included typical rail deterioration. Nonetheless, a 3dB(A) rail deterioration has been included for conservative assessment according to the approved EIAs for the Shatin to Central Link – Tai Wai to Hung Hom Section (AEIAR-167/2012) and Shatin to Central Link – Stabling Sidings at Hung Hom Freight Yard (AEIAR-164/2012)
Train speed	Change of SEL with speed = $20 \log (V / V_{ref})$ dB(A)	V and V_{ref} are the average train speeds
Distance	Change of SEL with distance = $10 \log (d_1 / 25)$ dB(A)	d_1 is the distance between track and receiver
Deck Reflection	• At-Grade ballast track = 0 dB(A) • At-Grade non-ballast track = 2.5 dB(A)	According to the approved EIAs for the Shatin to Central Link – Tai Wai to Hung Hom Section (AEIAR-167/2012) and Shatin to Central Link – Stabling Sidings at Hung Hom Freight Yard (AEIAR-164/2012)
Barrier effects	As per Chart 6(a) of CRN	-
Joints / Crossovers	7dB(A)	To represent the augmentation in noise due to thermal expansion joints. Similar approach has been adopted in the approved EIAs for the Shatin to Central Link – Tai Wai to Hung Hom Section (AEIAR-167/2012) and Shatin to Central Link – Stabling Sidings at Hung Hom Freight Yard (AEIAR-164/2012).
Air absorption	$0.2 - 0.008d$	-
Train Frequency	$10\log(N_1)$	• N_1 is the train frequency in 30 minutes • Frequency (trains / direction / 30 minutes)
View Angle	$10 \log (\pi\theta/180 - \cos2\alpha \sin\theta) - 5$ dB(A)	α is the acute angle between a line drawn through the receiver point, parallel to the track and the line bisecting the angle view θ. θ is the view angle.
Façade Reflection	2.5dB(A)	-
To $L_{eq, 30\ min}$	$10 \log(1 / 1800)$	-

A.1.1.1.2 Arup's train noise model (OveRail) is used to predict and assess the propagation of airborne train noise. The modelling methodology for propagation is based on the prediction procedures in CRN and it has been validated against the examples listed in CRN handbooks. In addition, OveRail has been adopted in recently approved EIAs for the Shatin to Central Link - Tai Wai to Hung Hom Section (AEIAR-167/2012) and Shatin to Central Link - Stabling Sidings at Hung Hom Freight Yard (AEIAR-164/2012). Rail noise measurement of L_{eq} (30 mins) dB(A) has been conducted at selected locations to validate the proposed CRN assessment methodology.

Page 1

\\HKGNTS22\acoustic\env\project\219844-70\12 Reports Deliverables\43 EIA Report\03 Final Draft\Appendices\4. Noise\Model files\Appendix 4.18 rail airborne equations .docx

Page 2

\\HKGNTS22\acoustic\env\project\219844-70\12 Reports Deliverables\43 EIA Report\03 Final Draft\Appendices\4. Noise\Model files\Appendix 4.18 rail airborne equations .docx