Project: Environmental Consultancy No. C1202 Environmental Impact Assessment for Tung Chung Line Extension
Tile: Groundborne Rail Noise and Vibration Assessment Results for Ma Wan Chung (Unmitigated)

NSR NO.:	MWC-03a
Floor:	Ground
Tunnel Radius (m):	3
Separation distance between tunnel top & ground level (Vertical) (m):	16.8
Separation distance between track and NSR (Horzontal) (m):	4
Speed (km/hr):	80
Headway per 30 minutes per track (Daytime):	10

Description	Type	Frequency, Hz																						
		3.15	4	5	6.3	8	10	12.5	16	20	25	32	40	50	63	80	100	125	160	200	250	315	400	500
Up Track																								
FDL, dB re lb/in$^{0.5}$		22.3	25.0	26.1	28.3	25.2	22.8	26.0	20.4	22.1	20.0	24.4	25.2	29.0	36.2	36.6	36.1	35.2	34.4	31.5	31.8	33.5	29.7	27.4
Speed correction, dB		2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
TCF, dB (0: bored tunnel; 1: cut-and-cover tunnel; 2: station structure)	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOC, dB (Y:with turnout / crossover; N: without turnout / crossover)	N	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Up Track Vibration Level, dB		24.8	27.5	28.6	30.8	27.7	25.3	28.5	22.9	24.6	22.5	26.9	27.7	31.5	38.7	39.1	38.6	37.7	36.9	34.0	34.3	36.0	32.2	29.9
Down Track																								
FDL, dB re lb/in$^{0.5}$		22.3	25.0	26.1	28.3	25.2	22.8	26.0	20.4	22.1	20.0	24.4	25.2	29.0	36.2	36.6	36.1	35.2	34.4	31.5	31.8	33.5	29.7	27.4
Speed correction, dB		2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
TCF, dB (0: bored tunnel; 1: cut-and-cover tunnel; 2: station structure)	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOC, dB (Y:with turnout / crossover; N: without turnout / crossover)	N	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Down Track Vibration Level, dB		24.8	27.5	28.6	30.8	27.7	25.3	28.5	22.9	24.6	22.5	26.9	27.7	31.5	38.7	39.1	38.6	37.7	36.9	34.0	34.3	36.0	32.2	29.9
Total Vibration Level																								
Total Vibration Level Outside Building		27.8	30.5	31.6	33.8	30.7	28.3	31.5	25.9	27.6	25.5	29.9	30.7	34.5	41.7	42.1	41.6	40.7	39.9	37.0	37.3	39.1	35.2	32.9
BCF, dB (1:1 to 2 storeys building, 2:2 to 4 storeys building, 3:large building on piles, 4:structures founded on rock)	1	0.0	0.0	0.0	0.0	-2.0	-5.0	-5.5	-6.5	-7.5	-8.0	-8.5	-8.5	-8.5	-8.5	-8.0	-7.5	-7.5	-7.0	-6.0	-5.0	-5.0	-5.0	-5.0
BVR - Up, dB (No. of floor increased)	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BVR - Resonance, dB		0.0	0.0	0.0	1.0	2.0	3.0	4.0	5.0	6.0	6.0	6.0	6.0	5.8	5.4	5.2	5.0	4.8	4.0	3.0	2.0	1.0	0.7	0.7
CTN, dB		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
SAF, dB		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Line Source Response, dB (1 TCRN, 2 YTE)	1	17.6	16.6	14.8	10.6	15.8	11.5	7.2	8.3	8.3	9.1	15.9	13.8	14.8	15.7	13.4	12.4	1.8	7.0	-1.9	2.1	-8.5	-13.2	-20.1
TIL, dB (0:Direct fixation; 1:BCT; 2:FST)	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Predicted Noise Level per train for two direction, dB		52.4	54.2	53.3	52.4	53.5	44.8	44.3	39.7	41.4	39.6	50.3	48.9	53.6	61.4	59.7	58.6	46.8	50.9	39.1	43.4	33.6	24.7	15.5
A-weighting factor		-108.9	-100.7	-93.1	-85.4	-77.8	-70.4	-63.4	-56.7	-50.5	-45	-39	-35	-30	-26	-23	-19	-16	-13	-11	-9	-7	-5	-3.2
Predicted Noise Level, $L_{eq\ (double\ passby)}$, dB(A)		-56.5	-46.5	-39.8	-33.0	-24.3	-25.6	-19.1	-17.0	-9.1	-5.1	10.9	14.3	23.4	35.2	37.2	39.5	30.7	37.5	28.2	34.8	27.0	19.9	12.3
Predicted Noise Level, $L_{max\ (double\ passby)}$, dB(A) [1]		-56.0	-46.0	-39.3	-32.5	-23.8	-25.1	-18.6	-16.5	-8.6	-4.6	11.4	14.8	23.9	35.7	37.7	40.0	31.2	38.0	28.7	35.3	27.5	20.4	12.8
Passby duration, s [2]		14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
Predicted Noise Level, $L_{eq,30min}$, dB(A) [3]		-64.6	-54.6	-47.9	-41.1	-32.4	-33.7	-27.2	-25.1	-17.2	-13.2	2.8	6.3	15.3	27.1	29.1	31.4	22.6	29.4	20.1	26.7	18.9	11.8	4.2
$L_{eq,30mins}$, dB(A)	36.5																							
Criteria	55.0																							
Exceedance	N																							

Notes:
[1] According to Appendix 9.3 of approved EIA 200/2011 Shatin to Central Link - Tai Wai to Hung Hom Section, Lmax has incorporated a +0.5 dB(A) correction to passby Leq.
[2] Duration based on site measurement.
[3] Leq,30mins = Leq(double passbys) + 10log(Passby duration in sec) + 3dB(A) + 10log(no. of events in 30mins per direction) - 32.6dB(A) (3dB(A) correction is added to Leq,30mins for leading and trailing effect for conservative approaches.)

Project: Environmental Consultancy No. C1202 Environmental Impact Assessment for Tung Chung Line Extension
Tile: Groundborne Rail Noise and Vibration Assessment Results for Yat Tung Estate (Unmitigated)

NSR NO.:	YTE-14a
Floor:	1/F
Tunnel Radius (m):	3
Separation distance between tunnel top & ground level (Vertical) (m):	16.5
Separation distance between track and NSR (Horzontal) (m):	22
Speed (km/hr):	80
Headway per 30 minutes per track (Daytime):	10

Description	Type	Frequency, Hz																							
		3.15	4	5	6.3	8	10	12.5	16	20	25	32	40	50	63	80	100	125	160	200	250	315	400	500
Up Track																									
FDL, dB re lb/in$^{0.5}$		22.3	25.0	26.1	28.3	25.2	22.8	26.0	20.4	22.1	20.0	24.4	25.2	29.0	36.2	36.6	36.1	35.2	34.4	31.5	31.8	33.5	29.7	27.4
Speed correction, dB		2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
TCF, dB (0: bored tunnel; 1: cut-and-cover tunnel; 2: station structure)	1	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0
TOC, dB (Y:with turnout / crossover; N: without turnout / crossover)	Y	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Up Track Vibration Level, dB		26.8	29.5	30.6	32.8	29.7	27.3	30.5	24.9	26.6	24.5	28.9	29.7	33.5	40.7	41.1	40.6	39.7	38.9	36.0	36.3	38.0	34.2	31.9
Down Track																									
FDL, dB re lb/in$^{0.5}$		22.3	25.0	26.1	28.3	25.2	22.8	26.0	20.4	22.1	20.0	24.4	25.2	29.0	36.2	36.6	36.1	35.2	34.4	31.5	31.8	33.5	29.7	27.4
Speed correction, dB		2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
TCF, dB (0: bored tunnel; 1: cut-and-cover tunnel; 2: station structure)	1	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0
TOC, dB (Y:with turnout / crossover; N: without turnout / crossover)	Y	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Down Track Vibration Level, dB		26.8	29.5	30.6	32.8	29.7	27.3	30.5	24.9	26.6	24.5	28.9	29.7	33.5	40.7	41.1	40.6	39.7	38.9	36.0	36.3	38.0	34.2	31.9
Total Vibration Level																									
Total Vibration Level Outside Building		29.8	32.5	33.6	35.8	32.7	30.3	33.5	27.9	29.6	27.5	31.9	32.7	36.5	43.7	44.1	43.6	42.7	41.9	39.0	39.3	41.1	37.2	34.9
BCF, dB (1:1 to 2 storeys building, 2:2 to 4 storeys building, 3:large building on piles, 4:structures founded on rock)	4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BVR - Up, dB (No. of floor increased)	1	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0
BVR - Resonance, dB		0.0	0.0	0.0	1.0	2.0	3.0	4.0	5.0	6.0	6.0	6.0	6.0	5.8	5.4	5.2	5.0	4.8	4.0	3.0	2.0	1.0	0.7	0.7
CTN, dB		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
SAF, dB		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Line Source Response, dB (1 TCRN, 2 YTE)	2	-0.3	-4.7	-8.0	-12.9	-11.1	-8.9	-7.3	-6.0	-2.0	0.9	-0.5	1.5	2.5	1.1	-0.1	-0.1	-1.8	-10.9	-12.9	-18.6	-19.3	-22.8	-26.4
TIL, dB (0:Direct fixation; 1:BCT; 2:FST)	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Predicted Noise Level per train for two direction, dB		34.5	32.8	30.6	28.9	28.7	29.4	35.2	32.0	38.6	39.4	42.3	45.1	49.8	55.2	54.2	53.6	50.8	40.0	34.1	27.7	27.8	20.1	14.2
A-weighting factor		-108.9	-100.7	-93.1	-85.4	-77.8	-70.4	-63.4	-56.7	-50.5	-45	-39	-35	-30	-26	-23	-19	-16	-13	-11	-9	-7	-5	-3.2
Predicted Noise Level, $L_{eq\ (double\ passby)}$, dB(A)		-74.4	-67.9	-62.5	-56.5	-49.1	-41.0	-28.2	-24.7	-11.9	-5.3	2.9	10.5	19.6	29.0	31.7	34.5	34.7	26.6	23.2	19.1	21.2	15.3	11.0
Predicted Noise Level, $L_{max\ (double\ passby)}$, dB(A) [1]		-73.9	-67.4	-62.0	-56.0	-48.6	-40.5	-27.7	-24.2	-11.4	-4.8	3.4	11.0	20.1	29.5	32.2	35.0	35.2	27.1	23.7	19.6	21.7	15.8	11.5
Passby duration, s [2]		14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
Predicted Noise Level, $L_{eq,30min}$, dB(A) [3]		-82.5	-76.0	-70.6	-64.6	-57.2	-49.1	-36.3	-32.8	-20.0	-13.4	-5.2	2.4	11.5	20.9	23.6	26.4	26.6	18.5	15.2	11.0	13.1	7.2	2.9
$L_{eq,30mins}$, dB(A)	31.5																							
Criteria	55.0																							
Exceedance	N																							

Notes:
[1] According to Appendix 9.3 of approved EIA 200/2011 Shatin to Central Link - Tai Wai to Hung Hom Section, Lmax has incorporated a +0.5 dB(A) correction to passby Leq.
[2] Duration based on site measurement.
[3] Leq,30mins = Leq(double passbys) + 10log(Passby duration in sec) + 3dB(A) + 10log(no. of events in 30mins per direction) - 32.6dB(A) (3dB(A) correction is added to Leq,30mins for leading and trailing effect for conservative approaches.)

Project: Environmental Consultancy No. C1202 Environmental Impact Assessment for Tung Chung Line Extension
Tile: Groundborne Rail Noise and Vibration Assessment Results for Area 33 (Unmitigated)

NSR NO.:	A33-05a
Floor:	1/F
Tunnel Radius (m):	3
Separation distance between tunnel top & ground level (Vertical) (m):	16.8
Separation distance between track and NSR (Horzontal) (m):	5
Speed (km/hr):	80
Headway per 30 minutes per track (Daytime):	10

Description	Type	Frequency, Hz																							
		3.15	4	5	6.3	8	10	12.5	16	20	25	32	40	50	63	80	100	125	160	200	250	315	400	500
Up Track																									
FDL, dB re lb/in$^{0.5}$		22.3	25.0	26.1	28.3	25.2	22.8	26.0	20.4	22.1	20.0	24.4	25.2	29.0	36.2	36.6	36.1	35.2	34.4	31.5	31.8	33.5	29.7	27.4
Speed correction, dB		2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
TCF, dB (0: bored tunnel; 1: cut-and-cover tunnel; 2: station structure)	1	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0
TOC, dB (Y:with turnout / crossover; N: without turnout / crossover)	Y	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Up Track Vibration Level, dB		26.8	29.5	30.6	32.8	29.7	27.3	30.5	24.9	26.6	24.5	28.9	29.7	33.5	40.7	41.1	40.6	39.7	38.9	36.0	36.3	38.0	34.2	31.9
Down Track																									
FDL, dB re lb/in$^{0.5}$		22.3	25.0	26.1	28.3	25.2	22.8	26.0	20.4	22.1	20.0	24.4	25.2	29.0	36.2	36.6	36.1	35.2	34.4	31.5	31.8	33.5	29.7	27.4
Speed correction, dB		2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
TCF, dB (0: bored tunnel; 1: cut-and-cover tunnel; 2: station structure)	1	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0
TOC, dB (Y:with turnout / crossover; N: without turnout / crossover)	Y	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Down Track Vibration Level, dB		26.8	29.5	30.6	32.8	29.7	27.3	30.5	24.9	26.6	24.5	28.9	29.7	33.5	40.7	41.1	40.6	39.7	38.9	36.0	36.3	38.0	34.2	31.9
Total Vibration Level																									
Total Vibration Level Outside Building		29.8	32.5	33.6	35.8	32.7	30.3	33.5	27.9	29.6	27.5	31.9	32.7	36.5	43.7	44.1	43.6	42.7	41.9	39.0	39.3	41.1	37.2	34.9
BCF, dB (1:1 to 2 storeys building, 2:2 to 4 storeys building, 3:large building on piles, 4:structures founded on rock)	4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BVR - Up, dB (No. of floor increased)	1	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0
BVR - Resonance, dB		0.0	0.0	0.0	1.0	2.0	3.0	4.0	5.0	6.0	6.0	6.0	6.0	5.8	5.4	5.2	5.0	4.8	4.0	3.0	2.0	1.0	0.7	0.7
CTN, dB		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
SAF, dB		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Line Source Response, dB (1 TCRN, 2 YTE)	2	1.9	-3.1	-6.7	-10.7	-8.9	-7.1	-5.7	-2.8	2.1	4.6	3.4	5.9	6.1	4.1	5.7	5.7	5.7	-8.0	-7.4	-16.3	-17.6	-19.0	-23.1
TIL, dB (0:Direct fixation; 1:BCT; 2:FST)	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Predicted Noise Level per train for two direction, dB		36.7	34.4	31.8	31.1	30.9	31.2	36.8	35.1	42.7	43.1	46.3	49.6	53.3	58.2	60.0	59.3	58.2	43.0	39.6	30.0	29.4	23.9	17.5
A-weighting factor		-108.9	-100.7	-93.1	-85.4	-77.8	-70.4	-63.4	-56.7	-50.5	-45	-39	-35	-30	-26	-23	-19	-16	-13	-11	-9	-7	-5	-3.2
Predicted Noise Level, $L_{eq\ (double\ passby)}$, dB(A)		-72.2	-66.3	-61.3	-54.3	-46.9	-39.2	-26.6	-21.6	-7.8	-1.6	6.9	15.0	23.1	32.0	37.5	40.2	42.1	29.6	28.7	21.4	22.8	19.1	14.3
Predicted Noise Level, $L_{max\ (double\ passby)}$, dB(A) [1]		-71.7	-65.8	-60.8	-53.8	-46.4	-38.7	-26.1	-21.1	-7.3	-1.1	7.4	15.5	23.6	32.5	38.0	40.7	42.6	30.1	29.2	21.9	23.3	19.6	14.8
Passby duration, s [2]		14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
Predicted Noise Level, $L_{eq,30min}$, dB(A) [3]		-80.3	-74.4	-69.3	-62.4	-55.0	-47.2	-34.6	-29.7	-15.9	-9.7	-1.2	6.9	15.0	23.9	29.4	32.1	34.1	21.5	20.6	13.4	14.7	11.0	6.2
$L_{eq,30mins}$, dB(A)	37.5																							
Criteria	55.0																							
Exceedance	N																							

Notes:
[1] According to Appendix 9.3 of approved EIA 200/2011 Shatin to Central Link - Tai Wai to Hung Hom Section, Lmax has incorporated a +0.5 dB(A) correction to passby Leq.
[2] Duration based on site measurement.
[3] Leq,30mins = Leq(double passbys) + 10log(Passby duration in sec) + 3dB(A) + 10log(no. of events in 30mins per direction) - 32.6dB(A) (3dB(A) correction is added to Leq,30mins for leading and trailing effect for conservative approaches.)

Project: Environmental Consultancy No. C1202 Environmental Impact Assessment for Tung Chung Line Extension
Tile: Groundborne Rail Noise and Vibration Assessment Results for Tung Chung Cresent (Unmitigated)

NSR NO.:	TCC-02a
Floor:	5/F [4]
Tunnel Radius (m):	3
Separation distance between tunnel top & ground (Vertical) (m):	7
Separation distance between track and NSR (Horzontal) (m):	50
Speed (km/hr):	80
Headway per 30 minutes per track (Daytime):	10

Description	Type	Frequency, Hz																							
		3.15	4	5	6.3	8	10	12.5	16	20	25	32	40	50	63	80	100	125	160	200	250	315	400	500
Up Track																									
FDL, dB re lb/in$^{0.5}$		22.3	25.0	26.1	28.3	25.2	22.8	26.0	20.4	22.1	20.0	24.4	25.2	29.0	36.2	36.6	36.1	35.2	34.4	31.5	31.8	33.5	29.7	27.4
Speed correction, dB		2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
TCF, dB (0: bored tunnel; 1: cut-and-cover tunnel; 2: station structure)	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOC, dB (Y:with turnout / crossover; N: without turnout / crossover)	N	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Up Track Vibration Level, dB		24.8	27.5	28.6	30.8	27.7	25.3	28.5	22.9	24.6	22.5	26.9	27.7	31.5	38.7	39.1	38.6	37.7	36.9	34.0	34.3	36.0	32.2	29.9
Down Track																									
FDL, dB re lb/in$^{0.5}$		22.3	25.0	26.1	28.3	25.2	22.8	26.0	20.4	22.1	20.0	24.4	25.2	29.0	36.2	36.6	36.1	35.2	34.4	31.5	31.8	33.5	29.7	27.4
Speed correction, dB		2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
TCF, dB (0: bored tunnel; 1: cut-and-cover tunnel; 2: station structure)	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOC, dB (Y:with turnout / crossover; N: without turnout / crossover)	N	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Down Track Vibration Level, dB		24.8	27.5	28.6	30.8	27.7	25.3	28.5	22.9	24.6	22.5	26.9	27.7	31.5	38.7	39.1	38.6	37.7	36.9	34.0	34.3	36.0	32.2	29.9
Total Vibration Level																									
Total Vibration Level Outside Building		27.8	30.5	31.6	33.8	30.7	28.3	31.5	25.9	27.6	25.5	29.9	30.7	34.5	41.7	42.1	41.6	40.7	39.9	37.0	37.3	39.1	35.2	32.9
BCF, dB (1:1 to 2 storeys building, 2:2 to 4 storeys building, 3:large building on piles, 4:structures founded on rock)	4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BVR - Up, dB (No. of floor increased)	4	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0
BVR - Resonance, dB		0.0	0.0	0.0	1.0	2.0	3.0	4.0	5.0	6.0	6.0	6.0	6.0	5.8	5.4	5.2	5.0	4.8	4.0	3.0	2.0	1.0	0.7	0.7
CTN, dB		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
SAF, dB		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Line Source Response, dB (1 TCRN, 2 YTE)	1	16.2	15.8	14.3	9.6	14.5	10.2	9.1	12.4	12.1	5.6	2.6	4.2	3.5	1.2	-2.4	-2.0	-5.3	-11.1	-15.7	-19.2	-26.1	-33.6	-39.6
TIL, dB (0:Direct fixation; 1:BCT; 2:FST)	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Predicted Noise Level per train for two direction, dB		43.0	45.3	44.9	43.4	46.2	40.6	43.6	42.3	44.7	36.1	37.5	39.8	42.8	47.3	43.9	43.6	39.3	31.9	23.3	19.2	12.9	1.3	-7.0
A-weighting factor		-108.9	-100.7	-93.1	-85.4	-77.8	-70.4	-63.4	-56.7	-50.5	-45	-39	-35	-30	-26	-23	-19	-16	-13	-11	-9	-7	-5	-3.2
Predicted Noise Level, $L_{eq\ (double\ passby)}$, dB(A)		-65.9	-55.4	-48.2	-42.0	-31.6	-29.8	-19.8	-14.4	-5.8	-8.6	-1.9	5.2	12.6	21.1	21.4	24.5	23.2	18.5	12.4	10.6	6.3	-3.5	-10.2
Predicted Noise Level, $L_{max\ (double\ passby)}$, dB(A) [1]		-65.4	-54.9	-47.7	-41.5	-31.1	-29.3	-19.3	-13.9	-5.3	-8.1	-1.4	5.7	13.1	21.6	21.9	25.0	23.7	19.0	12.9	11.1	6.8	-3.0	-9.7
Passby duration, s [2]		14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
Predicted Noise Level, $L_{eq,30min}$, dB(A) [3]		-74.0	-63.4	-56.3	-50.1	-39.7	-37.9	-27.8	-22.5	-13.9	-16.7	-10.0	-2.9	4.5	13.0	13.3	16.4	15.1	10.4	4.4	2.5	-1.8	-11.6	-18.3
$L_{eq,30mins}$, dB(A)	21.4																							
Criteria	55.0																							
Exceedance	N																							

Notes:
[1] According to Appendix 9.3 of approved EIA 200/2011 Shatin to Central Link - Tai Wai to Hung Hom Section, Lmax has incorporated a +0.5 dB(A) correction to passby Leq.
[2] Duration based on site measurement.
[3] Leq,30mins = Leq(double passbys) + 10log(Passby duration in sec) + 3dB(A) + 10log(no. of events in 30mins per direction) - 32.6dB(A) (3dB(A) correction is added to Leq,30mins for leading and trailing effect for conservative approaches.)
[4] For Tung Chung Crecsent, the lowest residental floor is started from 5/F while G/F to 4/F are clubhouse, carpark and other utilites. Hence, the first assessmet layer is 5/F.

Project: Environmental Consultancy No. C1202 Environmental Impact Assessment for Tung Chung Line Extension
Tile: Groundborne Rail Noise and Vibration Assessment Results for Ma Wan Chung (Unmitigated)

NSR NO.:	MWC-03a
Floor:	Ground
Tunnel Radius (m):	3
Separation distance between tunnel top & ground level (Vertical) (m):	16.8
Separation distance between track and NSR (Horzontal) (m):	4
Speed (km/hr):	80
Headway per 30 minutes per track (Nighttime):	7

Description	Type	Frequency, Hz																						
		3.15	4	5	6.3	8	10	12.5	16	20	25	32	40	50	63	80	100	125	160	200	250	315	400	500
Up Track																								
FDL, dB re lb/in$^{0.5}$		22.3	25.0	26.1	28.3	25.2	22.8	26.0	20.4	22.1	20.0	24.4	25.2	29.0	36.2	36.6	36.1	35.2	34.4	31.5	31.8	33.5	29.7	27.4
Speed correction, dB		2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
TCF, dB (0: bored tunnel; 1: cut-and-cover tunnel; 2: station structure)	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOC, dB (Y:with turnout / crossover; N: without turnout / crossover)	N	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Up Track Vibration Level, dB		24.8	27.5	28.6	30.8	27.7	25.3	28.5	22.9	24.6	22.5	26.9	27.7	31.5	38.7	39.1	38.6	37.7	36.9	34.0	34.3	36.0	32.2	29.9
Down Track																								
FDL, dB re lb/in$^{0.5}$		22.3	25.0	26.1	28.3	25.2	22.8	26.0	20.4	22.1	20.0	24.4	25.2	29.0	36.2	36.6	36.1	35.2	34.4	31.5	31.8	33.5	29.7	27.4
Speed correction, dB		2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
TCF, dB (0: bored tunnel; 1: cut-and-cover tunnel; 2: station structure)	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOC, dB (Y:with turnout / crossover; N: without turnout / crossover)	N	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Down Track Vibration Level, dB		24.8	27.5	28.6	30.8	27.7	25.3	28.5	22.9	24.6	22.5	26.9	27.7	31.5	38.7	39.1	38.6	37.7	36.9	34.0	34.3	36.0	32.2	29.9
Total Vibration Level																								
Total Vibration Level Outside Building		27.8	30.5	31.6	33.8	30.7	28.3	31.5	25.9	27.6	25.5	29.9	30.7	34.5	41.7	42.1	41.6	40.7	39.9	37.0	37.3	39.1	35.2	32.9
BCF, dB (1:1 to 2 storeys building, 2:2 to 4 storeys building, 3:large building on piles, 4:structures founded on rock)	1	0.0	0.0	0.0	0.0	-2.0	-5.0	-5.5	-6.5	-7.5	-8.0	-8.5	-8.5	-8.5	-8.5	-8.0	-7.5	-7.5	-7.0	-6.0	-5.0	-5.0	-5.0	-5.0
BVR - Up, dB (No. of floor increased)	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BVR - Resonance, dB		0.0	0.0	0.0	1.0	2.0	3.0	4.0	5.0	6.0	6.0	6.0	6.0	5.8	5.4	5.2	5.0	4.8	4.0	3.0	2.0	1.0	0.7	0.7
CTN, dB		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
SAF, dB		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Line Source Response, dB (1 TCRN, 2 YTE)	1	17.6	16.6	14.8	10.6	15.8	11.5	7.2	8.3	8.3	9.1	15.9	13.8	14.8	15.7	13.4	12.4	1.8	7.0	-1.9	2.1	-8.5	-13.2	-20.1
TIL, dB (0:Direct fixation; 1:BCT; 2:FST)	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Predicted Noise Level per train for two direction, dB		52.4	54.2	53.3	52.4	53.5	44.8	44.3	39.7	41.4	39.6	50.3	48.9	53.6	61.4	59.7	58.6	46.8	50.9	39.1	43.4	33.6	24.7	15.5
A-weighting factor		-108.9	-100.7	-93.1	-85.4	-77.8	-70.4	-63.4	-56.7	-50.5	-45	-39	-35	-30	-26	-23	-19	-16	-13	-11	-9	-7	-5	-3.2
Predicted Noise Level, $L_{eq\ (double\ passby)}$, dB(A)		-56.5	-46.5	-39.8	-33.0	-24.3	-25.6	-19.1	-17.0	-9.1	-5.1	10.9	14.3	23.4	35.2	37.2	39.5	30.7	37.5	28.2	34.8	27.0	19.9	12.3
Predicted Noise Level, $L_{max\ (double\ passby)}$, dB(A) [1]		-56.0	-46.0	-39.3	-32.5	-23.8	-25.1	-18.6	-16.5	-8.6	-4.6	11.4	14.8	23.9	35.7	37.7	40.0	31.2	38.0	28.7	35.3	27.5	20.4	12.8
Passby duration, s [2]		14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
Predicted Noise Level, $L_{eq\ 30min}$, dB(A) [3]		-66.1	-56.2	-49.4	-42.6	-33.9	-35.2	-28.8	-26.7	-18.7	-14.7	1.3	4.7	13.8	25.5	27.6	29.8	21.1	27.9	18.5	25.2	17.3	10.3	2.7

$L_{eq\ 30mins}$, dB(A)	35.0
Criteria	45.0
Exceedance	N

Notes:
[1] According to Appendix 9.3 of approved EIA 200/2011 Shatin to Central Link - Tai Wai to Hung Hom Section, Lmax has incorporated a +0.5 dB(A) correction to passby Leq.
[2] Duration based on site measurement.
[3] Leq,30mins = Leq(double passbys) + 10log(Passby duration in sec) + 3dB(A) + 10log(no. of events in 30mins per direction) - 32.6dB(A) (3dB(A) correction is added to Leq,30mins for leading and trailing effect for conservative approaches.)

Project: Environmental Consultancy No. C1202 Environmental Impact Assessment for Tung Chung Line Extension
Tile: Groundborne Rail Noise and Vibration Assessment Results for Yat Tung Estate (Unmitigated)

NSR NO.:	YTE-14a
Floor:	1/F
Tunnel Radius (m):	3
Separation distance between tunnel top & ground level (Vertical) (m):	16.5
Separation distance between track and NSR (Horzontal) (m):	22
Speed (km/hr):	80
Headway per 30 minutes per track (Nighttime):	7

Description	Type	Frequency, Hz																							
		3.15	4	5	6.3	8	10	12.5	16	20	25	32	40	50	63	80	100	125	160	200	250	315	400	500
Up Track																									
FDL, dB re lb/in$^{0.5}$		22.3	25.0	26.1	28.3	25.2	22.8	26.0	20.4	22.1	20.0	24.4	25.2	29.0	36.2	36.6	36.1	35.2	34.4	31.5	31.8	33.5	29.7	27.4
Speed correction, dB		2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
TCF, dB (0: bored tunnel; 1: cut-and-cover tunnel; 2: station structure)	1	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0
TOC, dB (Y:with turnout / crossover; N: without turnout / crossover)	Y	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Up Track Vibration Level, dB		26.8	29.5	30.6	32.8	29.7	27.3	30.5	24.9	26.6	24.5	28.9	29.7	33.5	40.7	41.1	40.6	39.7	38.9	36.0	36.3	38.0	34.2	31.9
Down Track																									
FDL, dB re lb/in$^{0.5}$		22.3	25.0	26.1	28.3	25.2	22.8	26.0	20.4	22.1	20.0	24.4	25.2	29.0	36.2	36.6	36.1	35.2	34.4	31.5	31.8	33.5	29.7	27.4
Speed correction, dB		2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
TCF, dB (0: bored tunnel; 1: cut-and-cover tunnel; 2: station structure)	1	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0
TOC, dB (Y:with turnout / crossover; N: without turnout / crossover)	Y	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Down Track Vibration Level, dB		26.8	29.5	30.6	32.8	29.7	27.3	30.5	24.9	26.6	24.5	28.9	29.7	33.5	40.7	41.1	40.6	39.7	38.9	36.0	36.3	38.0	34.2	31.9
Total Vibration Level																									
Total Vibration Level Outside Building		29.8	32.5	33.6	35.8	32.7	30.3	33.5	27.9	29.6	27.5	31.9	32.7	36.5	43.7	44.1	43.6	42.7	41.9	39.0	39.3	41.1	37.2	34.9
BCF, dB (1:1 to 2 storeys building, 2:2 to 4 storeys building, 3:large building on piles, 4:structures founded on rock)	4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BVR - Up, dB (No. of floor increased)	1	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0
BVR - Resonance, dB		0.0	0.0	0.0	1.0	2.0	3.0	4.0	5.0	6.0	6.0	6.0	6.0	5.8	5.4	5.2	5.0	4.8	4.0	3.0	2.0	1.0	0.7	0.7
CTN, dB		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
SAF, dB		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Line Source Response, dB (1 TCRN, 2 YTE)	2	-0.3	-4.7	-8.0	-12.9	-11.1	-8.9	-7.3	-6.0	-2.0	0.9	-0.5	1.5	2.5	1.1	-0.1	-0.1	-1.8	-10.9	-12.9	-18.6	-19.3	-22.8	-26.4
TIL, dB (0:Direct fixation; 1:BCT; 2:FST)	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Predicted Noise Level per train for two direction, dB		34.5	32.8	30.6	28.9	28.7	29.4	35.2	32.0	38.6	39.4	42.3	45.1	49.8	55.2	54.2	53.6	50.8	40.0	34.1	27.7	27.8	20.1	14.2
A-weighting factor		-108.9	-100.7	-93.1	-85.4	-77.8	-70.4	-63.4	-56.7	-50.5	-45	-39	-35	-30	-26	-23	-19	-16	-13	-11	-9	-7	-5	-3.2
Predicted Noise Level, $L_{eq\ (double\ passby)}$, dB(A)		-74.4	-67.9	-62.5	-56.5	-49.1	-41.0	-28.2	-24.7	-11.9	-5.3	2.9	10.5	19.6	29.0	31.7	34.5	34.7	26.6	23.2	19.1	21.2	15.3	11.0
Predicted Noise Level, $L_{max\ (double\ passby)}$, dB(A) [1]		-73.9	-67.4	-62.0	-56.0	-48.6	-40.5	-27.7	-24.2	-11.4	-4.8	3.4	11.0	20.1	29.5	32.2	35.0	35.2	27.1	23.7	19.6	21.7	15.8	11.5
Passby duration, s [2]		14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
Predicted Noise Level, $L_{eq,30min}$, dB(A) [3]		-84.1	-77.5	-72.1	-66.1	-58.8	-50.6	-37.8	-34.4	-21.5	-15.0	-6.7	0.9	10.0	19.3	22.1	24.8	25.0	17.0	13.6	9.5	11.5	5.7	1.3
$L_{eq,30mins}$, dB(A)	29.9																							
Criteria	45.0																							
Exceedance	N																							

Notes:
[1] According to Appendix 9.3 of approved EIA 200/2011 Shatin to Central Link - Tai Wai to Hung Hom Section, Lmax has incorporated a +0.5 dB(A) correction to passby Leq.
[2] Duration based on site measurement.
[3] Leq,30mins = Leq(double passbys) + 10log(Passby duration in sec) + 3dB(A) + 10log(no. of events in 30mins per direction) - 32.6dB(A) (3dB(A) correction is added to Leq,30mins for leading and trailing effect for conservative approaches.)

Project: Environmental Consultancy No. C1202 Environmental Impact Assessment for Tung Chung Line Extension
Tile: Groundborne Rail Noise and Vibration Assessment Results for Area 33 (Unmitigated)

NSR NO.:	A33-05a
Floor:	1/F
Tunnel Radius (m):	3
Separation distance between tunnel top & ground level (Vertical) (m):	16.8
Separation distance between track and NSR (Horzontal) (m):	5
Speed (km/hr):	80
Headway per 30 minutes per track (Nighttime):	7

Description	Type	Frequency, Hz																							
		3.15	4	5	6.3	8	10	12.5	16	20	25	32	40	50	63	80	100	125	160	200	250	315	400	500
Up Track																									
FDL, dB re lb/in$^{0.5}$		22.3	25.0	26.1	28.3	25.2	22.8	26.0	20.4	22.1	20.0	24.4	25.2	29.0	36.2	36.6	36.1	35.2	34.4	31.5	31.8	33.5	29.7	27.4
Speed correction, dB		2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
TCF, dB (0: bored tunnel; 1: cut-and-cover tunnel; 2: station structure)	1	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0
TOC, dB (Y:with turnout / crossover; N: without turnout / crossover)	Y	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Up Track Vibration Level, dB		26.8	29.5	30.6	32.8	29.7	27.3	30.5	24.9	26.6	24.5	28.9	29.7	33.5	40.7	41.1	40.6	39.7	38.9	36.0	36.3	38.0	34.2	31.9
Down Track																									
FDL, dB re lb/in$^{0.5}$		22.3	25.0	26.1	28.3	25.2	22.8	26.0	20.4	22.1	20.0	24.4	25.2	29.0	36.2	36.6	36.1	35.2	34.4	31.5	31.8	33.5	29.7	27.4
Speed correction, dB		2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
TCF, dB (0: bored tunnel; 1: cut-and-cover tunnel; 2: station structure)	1	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0
TOC, dB (Y:with turnout / crossover; N: without turnout / crossover)	Y	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Down Track Vibration Level, dB		26.8	29.5	30.6	32.8	29.7	27.3	30.5	24.9	26.6	24.5	28.9	29.7	33.5	40.7	41.1	40.6	39.7	38.9	36.0	36.3	38.0	34.2	31.9
Total Vibration Level																									
Total Vibration Level Outside Building		29.8	32.5	33.6	35.8	32.7	30.3	33.5	27.9	29.6	27.5	31.9	32.7	36.5	43.7	44.1	43.6	42.7	41.9	39.0	39.3	41.1	37.2	34.9
BCF, dB (1:1 to 2 storeys building, 2:2 to 4 storeys building, 3:large building on piles, 4:structures founded on rock)	4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BVR - Up, dB (No. of floor increased)	1	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0
BVR - Resonance, dB		0.0	0.0	0.0	1.0	2.0	3.0	4.0	5.0	6.0	6.0	6.0	6.0	5.8	5.4	5.2	5.0	4.8	4.0	3.0	2.0	1.0	0.7	0.7
CTN, dB		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
SAF, dB		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Line Source Response, dB (1 TCRN, 2 YTE)	2	1.9	-3.1	-6.7	-10.7	-8.9	-7.1	-5.7	-2.8	2.1	4.6	3.4	5.9	6.1	4.1	5.7	5.7	5.7	-8.0	-7.4	-16.3	-17.6	-19.0	-23.1
TIL, dB (0:Direct fixation; 1:BCT; 2:FST)	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Predicted Noise Level per train for two direction, dB		36.7	34.4	31.8	31.1	30.9	31.2	36.8	35.1	42.7	43.1	46.3	49.6	53.3	58.2	60.0	59.3	58.2	43.0	39.6	30.0	29.4	23.9	17.5
A-weighting factor		-108.9	-100.7	-93.1	-85.4	-77.8	-70.4	-63.4	-56.7	-50.5	-45	-39	-35	-30	-26	-23	-19	-16	-13	-11	-9	-7	-5	-3.2
Predicted Noise Level, $L_{eq\ (double\ passby)}$, dB(A)		-72.2	-66.3	-61.3	-54.3	-46.9	-39.2	-26.6	-21.6	-7.8	-1.6	6.9	15.0	23.1	32.0	37.5	40.2	42.1	29.6	28.7	21.4	22.8	19.1	14.3
Predicted Noise Level, $L_{max\ (double\ passby)}$, dB(A) [1]		-71.7	-65.8	-60.8	-53.8	-46.4	-38.7	-26.1	-21.1	-7.3	-1.1	7.4	15.5	23.6	32.5	38.0	40.7	42.6	30.1	29.2	21.9	23.3	19.6	14.8
Passby duration, s [2]		14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
Predicted Noise Level, $L_{eq,30min}$, dB(A) [3]		-81.8	-75.9	-70.9	-63.9	-56.6	-48.8	-36.2	-31.2	-17.5	-11.3	-2.8	5.3	13.5	22.4	27.9	30.6	32.5	19.9	19.1	11.8	13.2	9.4	4.6
$L_{eq,30mins}$, dB(A)	36.0																							
Criteria	45.0																							
Exceedance	N																							

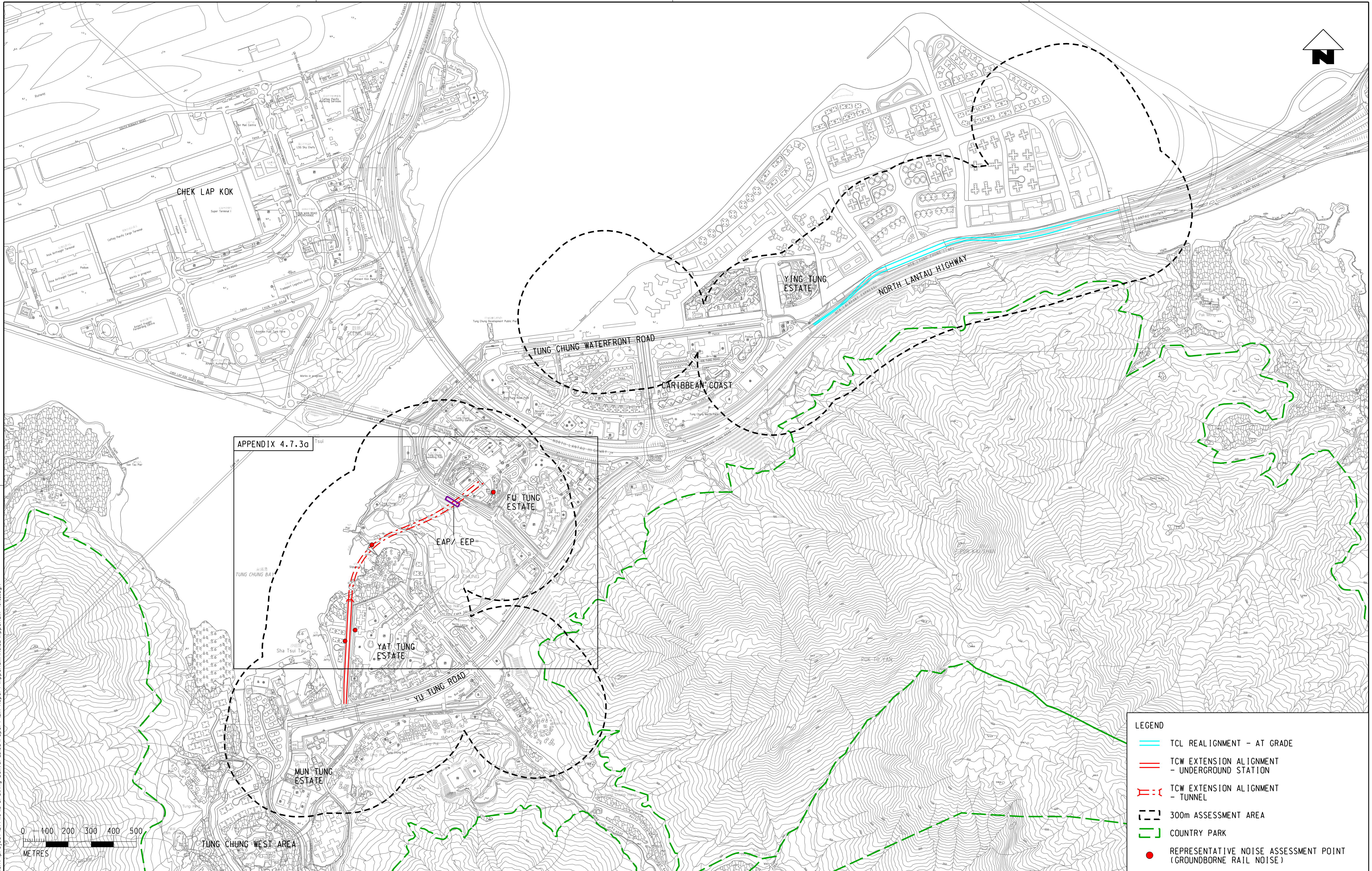
Notes:
[1] According to Appendix 9.3 of approved EIA 200/2011 Shatin to Central Link - Tai Wai to Hung Hom Section, Lmax has incorporated a +0.5 dB(A) correction to passby Leq.
[2] Duration based on site measurement.
[3] Leq,30mins = Leq(double passbys) + 10log(Passby duration in sec) + 3dB(A) + 10log(no. of events in 30mins per direction) - 32.6dB(A) (3dB(A) correction is added to Leq,30mins for leading and trailing effect for conservative approaches.)

Project: Environmental Consultancy No. C1202 Environmental Impact Assessment for Tung Chung Line Extension
Tile: Groundborne Rail Noise and Vibration Assessment Results for Tung Chung Cresent (Unmitigated)

NSR NO.:	TCC-02a
Floor:	5/F [4]
Tunnel Radius (m):	3
Separation distance between tunnel top & ground (Vertical) (m):	7
Separation distance between track and NSR (Horzontal) (m):	50
Speed (km/hr):	80
Headway per 30 minutes per track (Nighttime):	7

Description	Type	Frequency, Hz																							
		3.15	4	5	6.3	8	10	12.5	16	20	25	32	40	50	63	80	100	125	160	200	250	315	400	500
Up Track																									
FDL, dB re lb/in$^{0.5}$		22.3	25.0	26.1	28.3	25.2	22.8	26.0	20.4	22.1	20.0	24.4	25.2	29.0	36.2	36.6	36.1	35.2	34.4	31.5	31.8	33.5	29.7	27.4
Speed correction, dB		2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
TCF, dB (0: bored tunnel; 1: cut-and-cover tunnel; 2: station structure)	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOC, dB (Y:with turnout / crossover; N: without turnout / crossover)	N	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Up Track Vibration Level, dB		24.8	27.5	28.6	30.8	27.7	25.3	28.5	22.9	24.6	22.5	26.9	27.7	31.5	38.7	39.1	38.6	37.7	36.9	34.0	34.3	36.0	32.2	29.9
Down Track																									
FDL, dB re lb/in$^{0.5}$		22.3	25.0	26.1	28.3	25.2	22.8	26.0	20.4	22.1	20.0	24.4	25.2	29.0	36.2	36.6	36.1	35.2	34.4	31.5	31.8	33.5	29.7	27.4
Speed correction, dB		2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
TCF, dB (0: bored tunnel; 1: cut-and-cover tunnel; 2: station structure)	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOC, dB (Y:with turnout / crossover; N: without turnout / crossover)	N	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Down Track Vibration Level, dB		24.8	27.5	28.6	30.8	27.7	25.3	28.5	22.9	24.6	22.5	26.9	27.7	31.5	38.7	39.1	38.6	37.7	36.9	34.0	34.3	36.0	32.2	29.9
Total Vibration Level																									
Total Vibration Level Outside Building		27.8	30.5	31.6	33.8	30.7	28.3	31.5	25.9	27.6	25.5	29.9	30.7	34.5	41.7	42.1	41.6	40.7	39.9	37.0	37.3	39.1	35.2	32.9
BCF, dB (1:1 to 2 storeys building, 2:2 to 4 storeys building, 3:large building on piles, 4:structures founded on rock)	4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BVR - Up, dB (No. of floor increased)	4	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0
BVR - Resonance, dB		0.0	0.0	0.0	1.0	2.0	3.0	4.0	5.0	6.0	6.0	6.0	6.0	5.8	5.4	5.2	5.0	4.8	4.0	3.0	2.0	1.0	0.7	0.7
CTN, dB		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
SAF, dB		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Line Source Response, dB (1 TCRN, 2 YTE)	1	16.2	15.8	14.3	9.6	14.5	10.2	9.1	12.4	12.1	5.6	2.6	4.2	3.5	1.2	-2.4	-2.0	-5.3	-11.1	-15.7	-19.2	-26.1	-33.6	-39.6
TIL, dB (0:Direct fixation; 1:BCT; 2:FST)	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Predicted Noise Level per train for two direction, dB		43.0	45.3	44.9	43.4	46.2	40.6	43.6	42.3	44.7	36.1	37.5	39.8	42.8	47.3	43.9	43.6	39.3	31.9	23.3	19.2	12.9	1.3	-7.0
A-weighting factor		-108.9	-100.7	-93.1	-85.4	-77.8	-70.4	-63.4	-56.7	-50.5	-45	-39	-35	-30	-26	-23	-19	-16	-13	-11	-9	-7	-5	-3.2
Predicted Noise Level, $L_{eq\ (double\ passby)}$, dB(A)		-65.9	-55.4	-48.2	-42.0	-31.6	-29.8	-19.8	-14.4	-5.8	-8.6	-1.9	5.2	12.6	21.1	21.4	24.5	23.2	18.5	12.4	10.6	6.3	-3.5	-10.2
Predicted Noise Level, $L_{max\ (double\ passby)}$, dB(A) [1]		-65.4	-54.9	-47.7	-41.5	-31.1	-29.3	-19.3	-13.9	-5.3	-8.1	-1.4	5.7	13.1	21.6	21.9	25.0	23.7	19.0	12.9	11.1	6.8	-3.0	-9.7
Passby duration, s [2]		14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
Predicted Noise Level, $L_{eq,30min}$, dB(A) [3]		-75.6	-65.0	-57.9	-51.6	-41.2	-39.5	-29.4	-24.0	-15.4	-18.2	-11.6	-4.4	2.9	11.5	11.8	14.9	13.5	8.8	2.8	0.9	-3.3	-13.1	-19.8
$L_{eq,30mins}$, dB(A)	19.8																							
Criteria	45.0																							
Exceedance	N																							

Notes:
[1] According to Appendix 9.3 of approved EIA 200/2011 Shatin to Central Link - Tai Wai to Hung Hom Section, Lmax has incorporated a +0.5 dB(A) correction to passby Leq.
[2] Duration based on site measurement.
[3] Leq,30mins = Leq(double passbys) + 10log(Passby duration in sec) + 3dB(A) + 10log(no. of events in 30mins per direction) - 32.6dB(A) (3dB(A) correction is added to Leq,30mins for leading and trailing effect for conservative approaches.)
[4] For Tung Chung Crecsent, the lowest residental floor is started from 5/F while G/F to 4/F are clubhouse, carpark and other utilites. Hence, the first assessmet layer is 5/F.



REV	DESCRIPTION	BY	DATE	APPROVED
A	FIRST ISSUE	GL	170122	FC

DRAWN	GL
DESIGNED	GL
CHECKED	EL
APPROVED	FC
DATE	17/01/2022

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C1202 – EIA for Tung Chung Line Extension

ORIGINATOR

ARUP Ove Arup & Partners Hong Kong Limited

CADD REF. Appendix 4.7.3.dgn

TITLE

PREDICTED NOISE LEVELS OF REPRESENTATIVE NOISE ASSESSMENT POINTS (GROUNDBORNE RAIL NOISE)

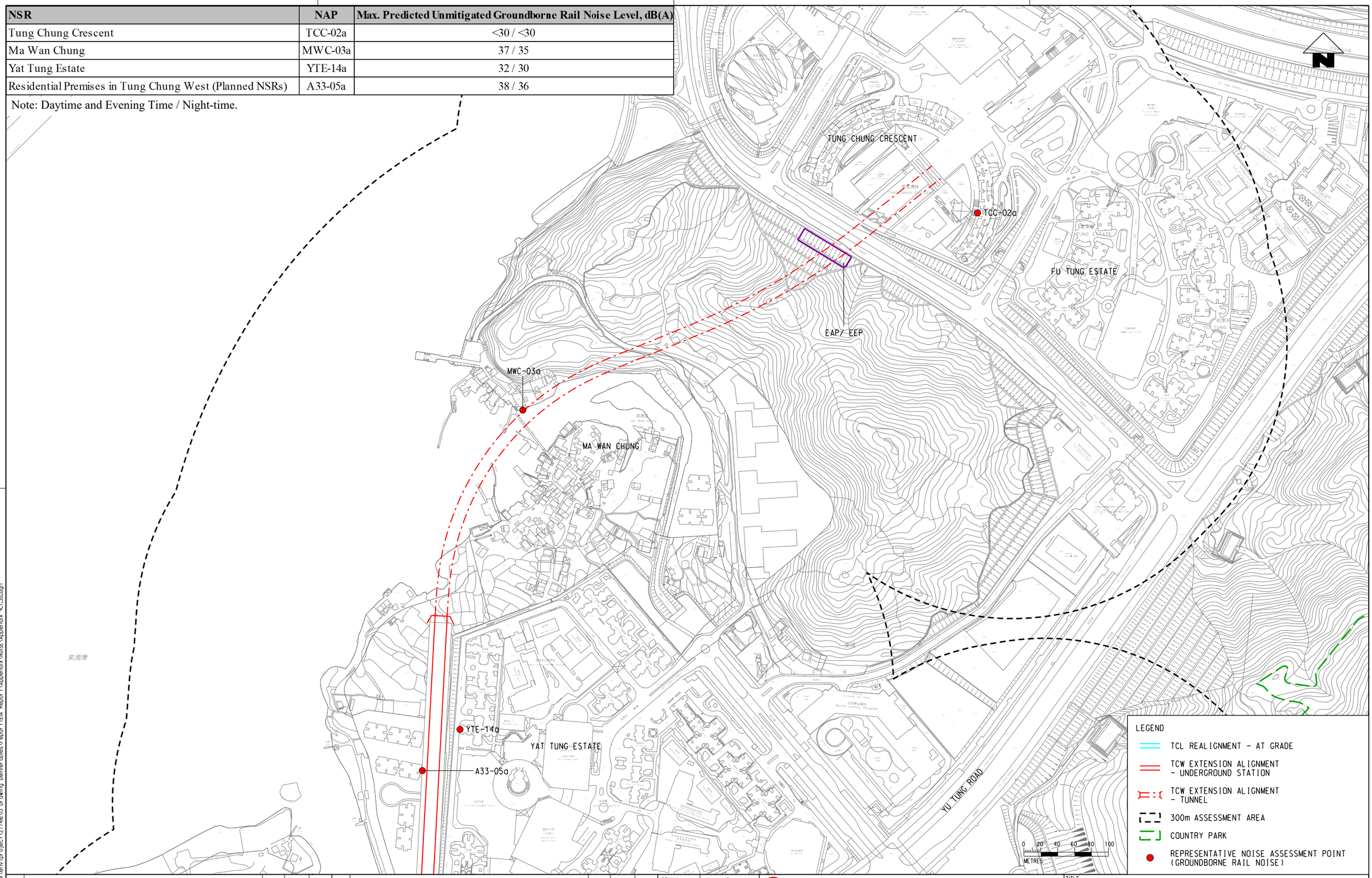
SCALE AS SHOWN

DRAWING NO. APPENDIX 4.7.3

REV. A

NSR	NAP	Max. Predicted Unmitigated Groundborne Rail Noise Level, dB(A)
Tung Chung Crescent	TCC-02a	<30 / <30
Ma Wan Chung	MWC-03a	37 / 35
Yat Tung Estate	YTE-14a	32 / 30
Residential Premises in Tung Chung West (Planned NSRs)	A33-05a	38 / 36

Note: Daytime and Evening Time / Night-time.



REV	DESCRIPTION	BY	DATE	APPROVED
A	FIRST ISSUE			

DRAWN	GL
DESIGNED	GL
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CADD REF. Appendix 4.7.3a.dgn

TITLE
PREDICTED NOISE LEVELS OF REPRESENTATIVE NOISE ASSESSMENT POINTS (GROUNDBORNE RAIL NOISE)

SCALE 1 : 4000 (A3)
DRAWING NO. APPENDIX 4.7.3a
REV. A

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