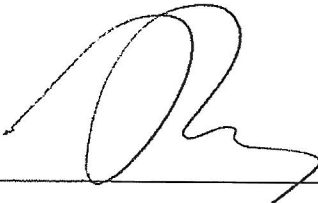


MTR Corporation Limited

HONG KONG SECTION OF GUANGZHOU –
SHENZHEN – HONG KONG EXPRESS RAIL LINK
(No. EP-349/2009/M)

Commissioning Test Report
for the Fixed Plant Noise at Pat Heung,
Nam Cheong and Mongkok West
Ventilation Building (PHV, NCV and MKV)

Verified by : 
(Eric Ching)

Position : Independent Environmental Checker

Date : 24 Jul. 18

MTR Corporation Limited

HONG KONG SECTION OF GUANGZHOU –
SHENZHEN – HONG KONG EXPRESS RAIL LINK
(No. EP-349/2009/M)

Commissioning Test Report
for the Fixed Plant Noise at Pat Heung,
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Certified by : 
(Raymond Wong)

Position : Environmental Team Leader

Date : 24 JUL 2018

Hong Kong Section of Guangzhou-Shenzhen- Hong Kong Express Rail Link (XRL)

Commissioning Test Report for
the Fixed Plant Noise at Pat
Heung (PHV), Nam Cheong (NCV)
and Mongkok West (MKV)
Ventilation Buildings

MTR Corporation

May 2018

Hong Kong Section of Guangzhou-Shenzhen-Hong Kong Express Rail Link (XRL)

Commissioning Test Report for the Fixed Plant Noise at Pat Heung (PHV), Nam Cheong (NCV) and Mongkok West (MKV) Ventilation Buildings

1 Introduction

The Hong Kong Section of Guangzhou-Shenzhen-Hong Kong Express Rail Link (XRL) Project (hereinafter known as “XRL”) covers a 26km long underground rail line on dedicated tracks that run between the terminus in West Kowloon and the boundary at Huanggang, where connects with the XRL Mainland section. XRL Project also includes the construction of ventilation buildings, emergency access points, stabling sidings and maintenance facilities and an emergency rescue siding (ERS) (formerly known as rescue emergency station).

The Environmental Impact Assessment (EIA) Report (Register No.: AEIA-143/2009) was approved on 28 September 2009 by the Director of Environmental Protection (DEP) under the Environmental Impact Assessment Ordinance (EIAO). Following the approval of the EIA Report, an environmental permit (EP) was granted on 16 October 2009 (EP No: EP-349/2009) for the construction and operation of the Project. Variations of environmental permit (VEP) were subsequently applied and the latest Environmental Permit (EP No: EP-349/2009/M) (hereinafter known as “the EP”) was issued by Director of Environmental Protection (DEP) on 25 June 2018.

This report is prepared with reference to EP Condition 2.36, *“The Permit Holder shall, no later than two weeks before the commencement of the operation of the Project, deposit with the Director a Commissioning Test Report to confirm the compliance of the operational airborne and ground-borne noise levels in accordance with the EIA Report and the application for variation of an environmental permit No. VEP-377/2012 and its attached documents”*.

MTR Corporation has prepared the Commissioning Test Report for Fixed Plant Noise for the noise measurement to show the compliance of noise criteria in accordance with the EIA Report and the EP; also the noise measurement for investigation of any tonal, impulsive and intermittent characteristics from the fixed plant noise sources. This report presents the noise measurement methodology, calculated Sound Power Levels from noise measurements, results of noise measurement for the fixed plant noise sources installed at Pat Heung (PHV), Nam Cheong (NCV) and Mongkok West (MKV) Ventilation Buildings and confirming any characteristics of tonality, impulsiveness and intermittency. For the fixed plant noise verification at the other ventilation buildings and West Kowloon Terminal (WKT) areas, separate reports would be submitted.

2 Noise Criteria

2.1 Fixed Plant Noise Criteria in EIA

With reference to the IND-TM under the Noise Control Ordinance (NCO), the relevant acceptable noise levels (ANL) were determined based on the area sensitivity rating (ASR). The fixed plant noise criteria for the representative noise sensitive receivers (NSRs) were determined in EIA as follow (whichever is lower):

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- 5dB(A) below the appropriate ANL set out in the IND-TM (the ANL-5dB(A) criterion);
or
- The prevailing background noise levels where the prevailing background noise level is 5dB(A) below the appropriate ANL (i.e. ANL-5dB(A))

The noise criteria above were determined for planning purpose. While for operation, the fixed plant noise is controlled by a Noise Abatement Notices system governed by the NCO.

The fixed plant noise criteria for the NSRs along the XRL alignment in PHV, NCV and MKV area, with the latest status of representative NSRs, are presented in **Table 2.1** below. Appropriate corrections in tonal, impulsive or intermittent characteristics should be applied, where applicable, in accordance with IND-TM during the commissioning test.

Table 2.1 Summary of Fixed Plant Noise Criteria

NSR	Description	Area Sensitivity Rating (ASR) ^(a)	Noise Criteria, dB(A) ^(a)	
			Day and Evening Time	Night-time
Pat Heung Ventilation Building (PHV) (Figure 2.1)				
PH1	Sheung Tsuen Village House	A	49	43
PH1a	Sheung Tsuen Village House	A	49	43
PH1b	Sheung Tsuen Village House	A	49	43
PH4	Sheung Tsuen Village House	A	49	43
PH4a	Sheung Tsuen Village House	A	49	43
Nam Cheong Ventilation Building (NCV) (Figure 2.2)				
NC10	St. Margaret's Coeducational English Secondary & Primary School	B	60	50
NC11	Tack Ching Girls' Secondary School	B	60	50
NC11e	Planned development (Site 6) Block 1	B	60	50
NC11f	Planned development (Site 6) Block 1	B	60	50
NC11g	Planned development (Site 6) Block 2	B	60	50
NC11h	Planned development (Site 6) Block 2	B	60	50
NC16	Tower 3 Aqua Marine	C	65	55
Mongkok West Ventilation Building (MKV) (Figure 2.3)				
MK1	Yau Ma Tei Catholic Primary School (Hoi	B	60	_(b)

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NSR	Description	Area Sensitivity Rating (ASR) ^(a)	Noise Criteria, dB(A) ^(a)	
			Day and Evening Time	Night-time
	Wang Road)			
MK3	Charming Garden Block 11	B	60	50

Note:

- (a) ASR and noise criteria either follow that defined in the EIA Report or relevant application for variation of environmental permit (VEP-377/2012) where appropriate.
- (b) There would be no noise sensitive use at MK1 during night-time period.

Fixed plant noise sources include: ventilation fans for building services, and plenum for tunnel ventilation, which are generally located inside plant rooms. Noise generated from indoor fixed plants would be emitted through louvres. The worst case scenario is when all eligible fixed plants at the same location operating concurrently under “normal scenario” for XRL operation during daytime and evening time periods; and night-time period, respectively. The worst case scenario was considered for compliance check against the fixed plant noise criteria and the noise measurement to confirm any characteristics of tonality, impulsiveness and intermittency at the identified NSRs.

Table 2.2 below summarised the information of the fixed plant noise sources and the layout plan is shown in **Figures 2.1** to **2.3a**.

Table 2.2 Summary of Fixed Plant Noise Sources

Source Location	Direction Facing	Louvre ID
<i>Pat Heung Ventilation Building (PHV) (Figure 2.1)</i>		
Tunnel ventilation shaft	North	N1
FS control room	North	N2
P&D pump and tank room	North	N3
Air duct riser	North	N4
Pressurization fan room	North	N5
Tunnel ventilation shaft	East	E1
Tunnel ventilation shaft	East	E2
Pressurization fan room	East	E3
Smoke extract make-up fan room	East	E4
Tunnel ventilation shaft	South	S1
UPS room	South	S2
SER	South	S3
MCC room	South	S4
Smoke extraction fan room	South	S5
ABBCS room	West	W1
Smoke extraction fan room	West	W2
<i>Nam Cheong Ventilation Building (NCV) (Figure 2.2)</i>		
Tunnel ventilation shaft	North	N1
FS Control Room	North	N2

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Source Location	Direction Facing	Louvre ID
E&M Service Area 8	North	N3
Tunnel ventilation shaft	East	E1
E&M Service Area 10	South	S1
E&M Service Area 10	South	S2
E&M Service Area 9	South	S3
Dog house	West	S4
LV Switch Room	West	W1
<i>Mongkok West Ventilation Building (MKV) (Figures 2.3 and 2.3a)</i>		
Tunnel ventilation shaft	North	N1
Tunnel ventilation shaft	North	N2
EVS	North	N3
Harmonic Filter Room	East	E1
Harmonic Filter Room	East	E2
25kV Switch Room	East	E3
SVS	East	E4
Staircase Pressurization Fan Room 2	South	S1
Staircase Pressurization Fan Room 1	South	S2
Battery and Charge Room	South	S3
Harmonic Filter Room	South	S4
Fire Pump room (Electrical)	West	W1
FHP	North	FHP-N1

3 Methodology

3.1 Noise Measurement for the Fixed Plants

Noise measurements to obtain the noise levels of the fixed plants were undertaken by Supreme Acoustics Research Limited, GAS Joint Venture and ATAL Building Services Engineering Ltd. The commissioning tests were carried out by qualified persons possessing at least 7 years of noise control experience and a corporate member of Hong Kong Institute of Acoustics or equivalent in accordance with S3.22 of the XRL EM&A Manual.

3.1.1 Methodology

Three measurement methods, namely Method 1 (at or near NSR), Method 2 (Far Field) and Method 3 (Near Field), have been developed based on NCO-TM, basic acoustic principles and *ISO 3746-2010: Acoustics – Determination of sound power levels and sound energy levels of noise sources using sound pressure – Survey method using an enveloping measurement surface over a reflecting plane*, respectively. Given the fixed plant noise sources are steady, all proposed methods could be adopted for all types of fixed plant source depending on the site environment/constraints that might affect the possibility to obtain valid results, considerations including but not limited to:

- Background noise with less influence to the measured noise levels
- Free of obstacles between measurement location and noise source
- Accessibility and Safety Concerns

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Considering the reliability of data collection, i.e. results not influenced by the above-mentioned considerations, and the measurement efficiency on site, the selection of methodology was prioritized based on efficient measurement as Method 1 (at or near NSR) > Method 2 (Far Field) > Method 3 (Near Field). However, various considerations which may affect the validity of results using Method 1 were taken in account, such as the distances between fixed plants and NSRs at PHV and NCV, some of the NSRs at PHV and NCV are too far away, some of the NSRs at PHV and NCV could not meet at least two times of the largest dimension from louvre etc. For MKV, considering there are other building structures between the NSR and noise sources, also the heavily trafficked Hoi Wang Road was immediately in front of the NSRs; obtaining valid results using Method 1 was considered unlikely. As such, only Method 2 and Method 3 were considered applicable. Method used for each louvre is presented in Appendix A3. Details of the measurement methodology are shown in **Appendix A1**.

Method 1 – Measuring Sound Pressure Level at NSR or Near NSR

- Measurement at NSR or near NSR at distance D away from the louvre, where D was at least two times the largest dimension b of the louvre and rounded up to integer, i.e.: $D \geq 2b$
- The microphone was pointing toward the louvre and three measurements were taken when the noise source from the louvre was switched ON
- Background noise level was taken when the noise source from louvre was switched OFF
- The sound pressure level (SPL) at NSR or near NSR was determined by the following equation:

$$\text{Background corrected } L_p = L_p + BG - [20\log D + 8] \text{ (if applicable) } + \text{façade correction (if applicable)}$$

Where

L_p is the average $L_{eq,1min}$ of all measurements, in dB(A);

BG is the background correction factor, in dB(A);

D is separation between the center of louvre or surface of the plant and the microphone, in metres.

Method 2 – Measuring Sound Power Level by Far Field Method for Louvres or for Plants

- The microphone was positioned at the perpendicular distance D away from the center of the louvre or the surface of the plant, where D was at least two times the largest dimension b of the louvre or plant and rounded up to integer, i.e.: $D \geq 2b$
- The microphone was pointing toward the center of the louvre/combined louvre area or the center the plant; and three measurements were taken when the noise source from the louvre was switched ON

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- Background noise level was taken when the noise source from the louvre or plant was switched OFF
- The sound power level (SWL) of the louvre or the plant was determined, based on basic acoustic principles, by the following equation:

$$L_w = L_p + 20\log D, center + 8 + BG$$

Where

L_p is the average $L_{eq,1min}$ of all measurements, in dB(A);

$D, center$ is separation between the center of louvre or plant and the microphone, in metres;

BG is the background correction factor, in dB(A).

Method 3 – Measuring Sound Power Level by Near Field Method for Louvres or for Plants

- A right parallelepiped hypothetical measurement box for each louvre or each surface of a plant was determined according to ISO 3746, with each side being spaced a distance D from the corresponding side of the louvre or plant
- Each of the 5 planes of the measurement box was subdivided into equal-sized rectangular grids, the length of each side of the grids should be less than or equal to 3 times of distance D , i.e. grid length $\leq 3D$
- The microphone was pointing toward the center of each grid, and a measurement was taken for each grid during the noise source from the louvre was switched ON
- Background noise level was taken when the noise source from louvre or plant was switched OFF
- The SWL of the louvre or the plant was determined by the following equation:

$$L_w = L_p + 10\log(S) - K_{1A} - K_{2A}$$

Where

L_p is the averaged measured L_{eq} of all measurement points, in dB(A);

S is the total surface area over the measurement box (total 5 planes), in m^2 ;

K_{1A} is the background correction factor as described in ISO 3746:2010, in dB(A);

K_{2A} is the environmental correction for sound absorption and reflection as described in ISO 3746:2010, in dB(A).

Except for Method 3, which was adopted with reference to ISO 3746; the noise sources measured using Method 1 or Method 2 were considered steady if the difference between the maximum and minimum L_{eq} is less than or equal to 1dB(A), ie, $\leq 1dB(A)$; average L_{eq} was therefore considered. Otherwise, the maximum L_{eq} would be adopted for SWL determination as a conservative approach.

3.1.2 Measurement Equipment

The sound level meters and calibrators used for noise measurements are listed in **Table 3.1**. The instruments complied with International Electrotechnical Commission Publications

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651:1979 (Type 1) and 804:1985 (Type 1) or equivalent international standards. Calibration certificates are shown in **Appendix A2**.

Table 3.1 Noise Measurement Equipment

Equipment	Model	Serial Number
Sound Level Meter	NTi XL2	5011
	NTi XL2	5617
	NTi XL2	6240
	Casella CEL-63X	5044655
Calibrator	BSWA TECH CA111	320248
	Casella CEL-120/1	5060836

Before and after each series of measurements, a calibration check was carried out on the sound level meter by the calibrator. The difference between the readings made before and after each series of measurements shall be less than or equal to 1.0 dB.

3.1.3 Measurement Schedule

The noise measurements were carried out during daytime, evening time and night-time periods, where the fixed plant items were operated steadily and continuously at their noisiest operating mode under normal scenario. The noise measurement schedule is shown in **Table 3.2**.

Table 3.2 Measurement Schedule

Location	Date	Time
PHV	10 – 11 August 2017	22:00 – 05:00
	8 September 2017	10:30 – 15:00
	13 September 2017	10:30 – 12:00
NCV	19 – 20 July 2017	22:00 – 04:00
	20 – 21 October 2017	23:00 – 04:00
	9 November 2017	23:30 – 04:00
MKV	9 – 10 May 2017	22:00 – 02:00
	25 – 26 July 2017	22:00 – 02:00
	21 November 2017	23:00 – 04:00
	4 December 2017	10:00 – 12:00

3.2 Noise Measurement to Confirm Any Characteristics of Tonality, Impulsiveness and Intermittency at NSRs

3.2.1 Measurement Equipment

The sound level meters and calibrators used for noise measurements are listed in **Table 3.3**. The instruments complied with International Electrotechnical Commission Publications 651:1979 (Type 1) and 804:1985 (Type 1) or equivalent international standards. Calibration certificates are shown in **Appendix A2**.

Table 3.3 Noise Measurement Equipment

Equipment	Model	Serial Number
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Sound Level Meter	Casella CEL-63X	5044655
Calibrator	Casella CEL-120/1	5060836

3.2.2 Measurement Parameters

With reference to the IND-TM, the noise measurement was conducted at the representative NSR for $L_{Aeq(30min)}$ in one-third octave band under the worst case scenario, ie, “normal scenario” during daytime and evening time periods; and night-time period, respectively.

The fixed plant noise sources will be operated steadily and continuously, and therefore no intermittency and impulsiveness are expected at the NSR. However, the characteristics of intermittency and impulsiveness will be recorded, if any, based on observation during measurement.

2 sets of background noise level, $L_{Aeq(5min)}$, and in one-third octave band, were measured at each measurement location when all fixed plant noise sources were not in operation.

3.2.3 Measurement Location

The noise measurement was carried out at the first layer of NSRs for the concerned areas. The measurement locations are summarised in Table 3.4 and shown in **Figures 2.1 to 2.3**.

Table 3.4 Measurement Schedule

Location	NSR	Description
PHV	PH1a	Sheung Tsuen Village House
	PH1b	Sheung Tsuen Village House
	PH4	Sheung Tsuen Village House
NCV	NC11	Tack Ching Girls' Secondary School
	NC11f ^(a)	Planned development (Site 6), Block 1
	NC11g ^(a)	Planned development (Site 6), Block 2
MKV	MK1	Yau Ma Tei Catholic Primary School (Hoi Wan Road)

Note:

- (a) The actual measurement location was selected based on the latest building layout.

3.2.4 Measurement Schedule

The noise measurements were carried out at the monitoring location for PHV, NCV and MKV, where the fixed plant items were operated steadily and continuously at their noisiest operating mode under normal scenario. The noise measurement schedule is shown in **Table 3.5**.

Table 3.5 Measurement Schedule

Location	Date
PHV	2-3 May 2018
NCV	15-16 May 2018
MKV	10-11 May 2018

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4 Measurement Results

4.1 The Noise Levels of Fixed Plant Noise Sources

The noise levels measured under the worst case scenario are determined and presented in **Table 4.1**. Details of the measurement results are shown in **Appendix A3**.

Table 4.1 Summary of Sound Power Levels for Fixed Plants

Works Area	Direction Facing/ Elevation	Calculated SWL L_{Aeq} dB(A)
PHV	North N1	78
	North N2	61
	North N3	72
	North N4	74
	North N5 ^(a)	74
	East E1	79
	East E2	78
	East E3 ^(a)	77
	East E4 ^(a)	83
	South S1	80
	South S2 ^(a)	80
	South S3	63
	South S4	62
	South S5 ^(a)	81
	West W1	66
	West W2 ^(a)	85
NCV	North N1	81
	North N2	67
	North N3	78
	East E1	82
	South S1	72
	South S2	72
	South S3 ^(a)	69
	South S4	82
	West W1	74
MKV	North N1	86
	North N2	87
	North N3	80
	East E1	78
	East E2 ^(a)	72
	East E3	73
	East E4	79
	South S1 ^(a)	74
	South S2 ^(a)	75
	South S3	85
	South S4	72
	West W1	90
	North FHP-N1	84

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Note:

- (a) The plant would be operated during day and evening time only under normal scenario.

A compliance check against the fixed plant noise criteria at NSR was conducted. The cumulative noise levels from noise sources were assessed to ensure the compliance with the noise criterion. **Table 4.2** shows the results, details of the calculation are also given in **Appendix A3**.

Table 4.2 Cumulative Fixed Plant Noise at NSR

NSR	Source Location	Cumulative SPL, dB(A)		Noise Criteria, dB(A)		Compliance (Y/N)	
		Day and Evening Time	Night-time	Day and Evening Time	Night-time	Day and Evening Time	Night-time
PH1	Ventilation Shaft for N/B ^(a) and Building Service	44	29	49	43	Y	Y
PH1	Ventilation Shaft for S/B ^(a) and Building Service	45	38	49	43	Y	Y
PH1a	Ventilation Shaft for N/B ^(a) and Building Service	46	30	49	43	Y	Y
PH1a	Ventilation Shaft for S/B ^(a) and Building Service	47	40	49	43	Y	Y
PH1b	Ventilation Shaft for N/B ^(a) and Building Service	42	33	49	43	Y	Y
PH1b	Ventilation Shaft for S/B ^(a) and Building Service	43	39	49	43	Y	Y
PH4	Ventilation Shaft for N/B ^(a) and Building Service	42	36	49	43	Y	Y
PH4	Ventilation Shaft for S/B ^(a) and Building Service	42	32	49	43	Y	Y
PH4a	Ventilation Shaft for N/B ^(a) and Building Service	38	35	49	43	Y	Y
PH4a	Ventilation Shaft for S/B ^(a) and Building Service	36	31	49	43	Y	Y
NC10	Ventilation Shaft for N/B ^(a) and Building Service	36	36	60	50	Y	Y
NC10	Ventilation Shaft	35	35	60	50	Y	Y

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NSR	Source Location	Cumulative SPL, dB(A)		Noise Criteria, dB(A)		Compliance (Y/N)	
		Day and Evening Time	Night- time	Day and Evening Time	Night- time	Day and Evening Time	Night- time
	for S/B ^(a) and Building Service						
NC11	Ventilation Shaft for N/B ^(a) and Building Service	37	33	60	50	Y	Y
NC11	Ventilation Shaft for S/B ^(a) and Building Service	38	36	60	50	Y	Y
NC11e	Ventilation Shaft for N/B ^(a) and Building Service	46	43	60	50	Y	Y
NC11e	Ventilation Shaft for S/B ^(a) and Building Service	46	42	60	50	Y	Y
NC11f	Ventilation Shaft for N/B ^(a) and Building Service	46	45	60	50	Y	Y
NC11f	Ventilation Shaft for S/B ^(a) and Building Service	45	43	60	50	Y	Y
NC11g	Ventilation Shaft for N/B ^(a) and Building Service	48	47	60	50	Y	Y
NC11g	Ventilation Shaft for S/B ^(a) and Building Service	39	38	60	50	Y	Y
NC11h	Ventilation Shaft for N/B ^(a) and Building Service	47	47	60	50	Y	Y
NC11h	Ventilation Shaft for S/B ^(a) and Building Service	39	38	60	50	Y	Y
NC16	Ventilation Shaft for N/B ^(a) and Building Service	32	28	65	55	Y	Y
NC16	Ventilation Shaft for S/B ^(a) and Building Service	33	31	65	55	Y	Y
MK1	Ventilation Shaft for N/B ^(a) and Building Service	38	-(b)	60	-	Y	-
MK1	Ventilation Shaft for S/B ^(a) and Building Service	40	-(b)	60	-	Y	-

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NSR	Source Location	Cumulative SPL, dB(A)		Noise Criteria, dB(A)		Compliance (Y/N)	
		Day and Evening Time	Night-time	Day and Evening Time	Night-time	Day and Evening Time	Night-time
MK3	Ventilation Shaft for N/B ^(a) and Building Service	35	35	60	50	Y	Y
MK3	Ventilation Shaft for S/B ^(a) and Building Service	37	36	60	50	Y	Y

Note:

- (a) Tunnel ventilation would only be operated for either northbound (N/B) or southbound (S/B) direction under normal scenario.
- (b) There would be no noise sensitive use at MK1 during night-time period.

4.2 The Characteristics of Tonality, Impulsiveness and Intermittency at NSRs

Noise measurement to confirm any characteristics of tonality, impulsiveness and intermittency at the identified NSRs were conducted under the normal scenarios during daytime and evening, and during night-time, respectively and summarised in **Table 4.3** below. In each scenario, two sets of noise measurements, $L_{Aeq(30min)}$, in one-third octave band, were carried out to confirm that the difference in the measured noise levels with and without operation of fixed plant noise sources were less than 3.0 dB(A). That means the fixed plant noise sources from the ventilation building are not considered as significant noise sources at the NSR. Noise measurements at PHV, NCV and MKV were dominated by the community noise and road traffic noise along Sham Mong Road and Hoi Wang Road, respectively; characteristics of tonality, impulsiveness and intermittency due to the fixed plant noise sources from the ventilation buildings was not noticeable during the measurement. Detailed results of noise measurements are shown in **Appendix A4**.

Table 4.3 Noise measurement Results at NSR

NSR	Scenario	Measured Noise Level $L_{Aeq(30min)}$, dB(A), (measurement time)	Averaged Background Level $L_{Aeq(5min)}$, dB(A), (measurement time)	Difference between Measured Noise Level and Background Level, dB(A), (< 3.0 or >= 3.0)
PH1a	Day and Evening Time	51.7 (22:19 – 22:49) 50.4 (22:50 – 23:20)	52.8 (21:56 – 22:06)	< 3.0
	Night-time	49.9 (23:28 – 23:58) 49.1 (23:58 – 00:28)	48.8 (00:47 – 00:57)	< 3.0
PH1b	Day and Evening Time	46.6 (22:23 – 22:53) 46.4 (22:53 – 23:23)	45.9 (22:00 – 22:10)	< 3.0
	Night-time	46.7 (23:38 – 00:08) 47.1 (00:08 – 00:13)	45.9 (00:50 – 01:02)	< 3.0
PH4	Day and Evening	45.9 (22:20 – 22:50) 45.1 (22:51 – 23:21)	46.5 (21:56 – 22:09)	< 3.0

Hong Kong Section of Guangzhou-Shenzhen-Hong Kong Express Rail Link (XRL)

Commissioning Test Report for the Fixed Plant Noise at Pat Heung (PHV), Nam Cheong (NCV) and Mongkok West (MKV) Ventilation Buildings

NSR	Scenario	Measured Noise Level $L_{Aeq(30min)}$, dB(A), (measurement time)	Averaged Background Level $L_{Aeq(5min)}$, dB(A), (measurement time)	Difference between Measured Noise Level and Background Level, dB(A), (< 3.0 or >= 3.0)
	Time			
	Night-time	44.7 (23:26 – 23:56) 44.9 (00:02 – 00:32)	42.8 (00:48 – 01:00)	< 3.0
NC11	Day and Evening Time	65.9 (22:30 – 23:00) 65.3 (23:02 – 23:32)	65.5 (21:40 – 21:59)	< 3.0
	Night-time	66.4 (23:38 – 00:08) 66.3 (00:09 – 00:39)	64.2 (00:44 – 00:55)	< 3.0
NC11f	Day and Evening Time	60.3 (22:23 - 22:53) 59.6 (22:55 - 23:25)	59.9 (22:01 - 22:12)	< 3.0
	Night-time	58.9 (23:31 - 00:01) 58.8 (00:02 - 00:32)	57.4 (00:38 - 00:49)	< 3.0
NC11g	Day and Evening Time	60.5 (22:22 – 22:52) 59.5 (22:53 – 23:23)	60.3 (21:51 – 22:12)	< 3.0
	Night-time	59.0 (23:31 – 00:01) 58.7 (00:01 – 00:31)	57.3 (00:39 – 00:49)	< 3.0
MK1	Day and Evening Time	64.3 (21:54 – 22:24) 63.3 (22:25 – 22:55)	63.8 (21:24 – 21:40)	< 3.0
	Night-time	58.5 (00:47 – 01:17) 57.2 (01:20 – 01:50)	60.8 (00:00 – 00:14)	< 3.0

As the differences between measured noise levels and background levels are all less than 3.0 dB(A), it was unable to obtain reliable corrected noise levels at the NSRs and corrections for tonality, impulsiveness or intermittency were therefore not applicable.

5 Conclusions

To fulfil the XRL EP condition 2.36, the fixed plant noise verification were undertaken and the measurement results indicated all the fixed plant noise levels in PHV, NCV and MKV are in compliance with the fixed plant noise criteria.

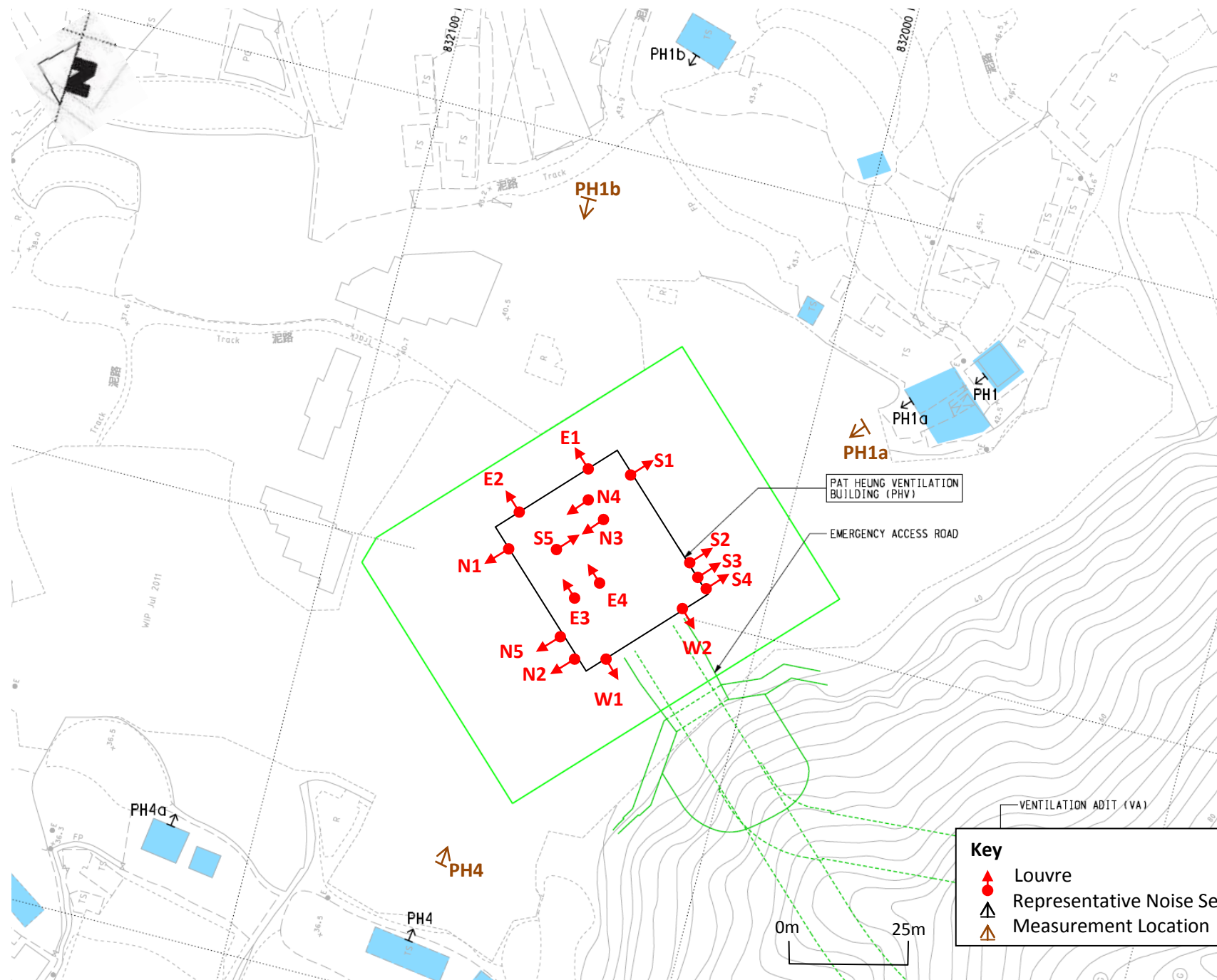


Figure 2.1 – Site layout, Noise Sensitive Receiver (NSR) and Fixed Plant Sources at PHV

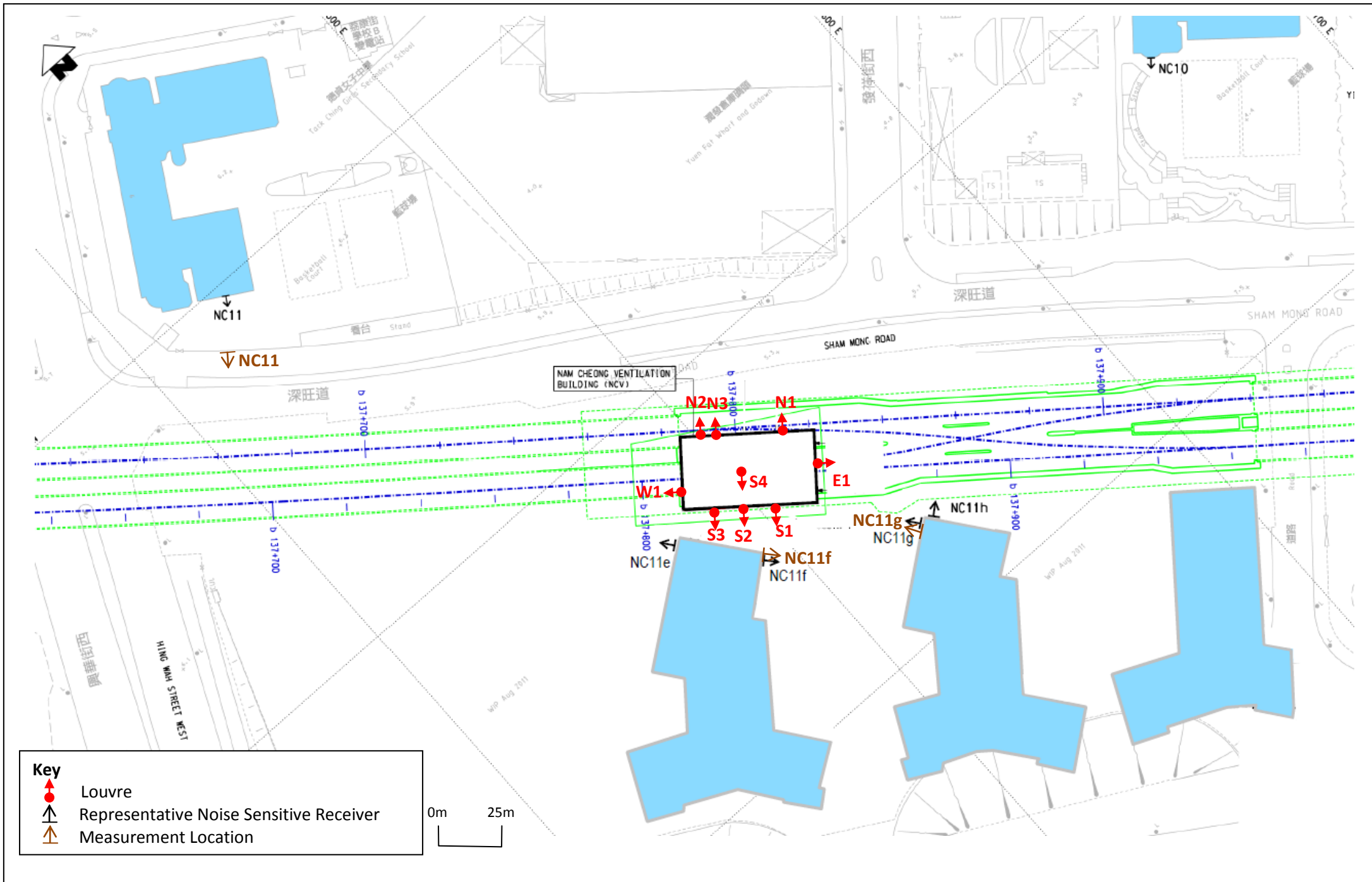


Figure 2.2 – Site layout, Noise Sensitive Receiver (NSR) and Fixed Plant Sources at NCV

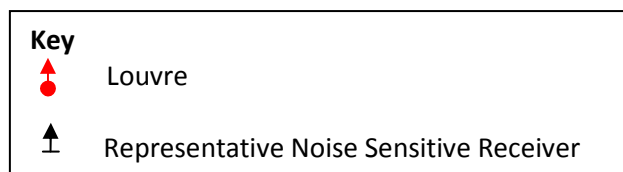


Figure 2.3a – Site layout, Noise Sensitive Receiver (NSR) and Fixed Plant Sources at MKV

Appendix A1 –Measurement Methodology



XRL Fixed Plant Noise Test Plan

BY : MTR XRL Env Team

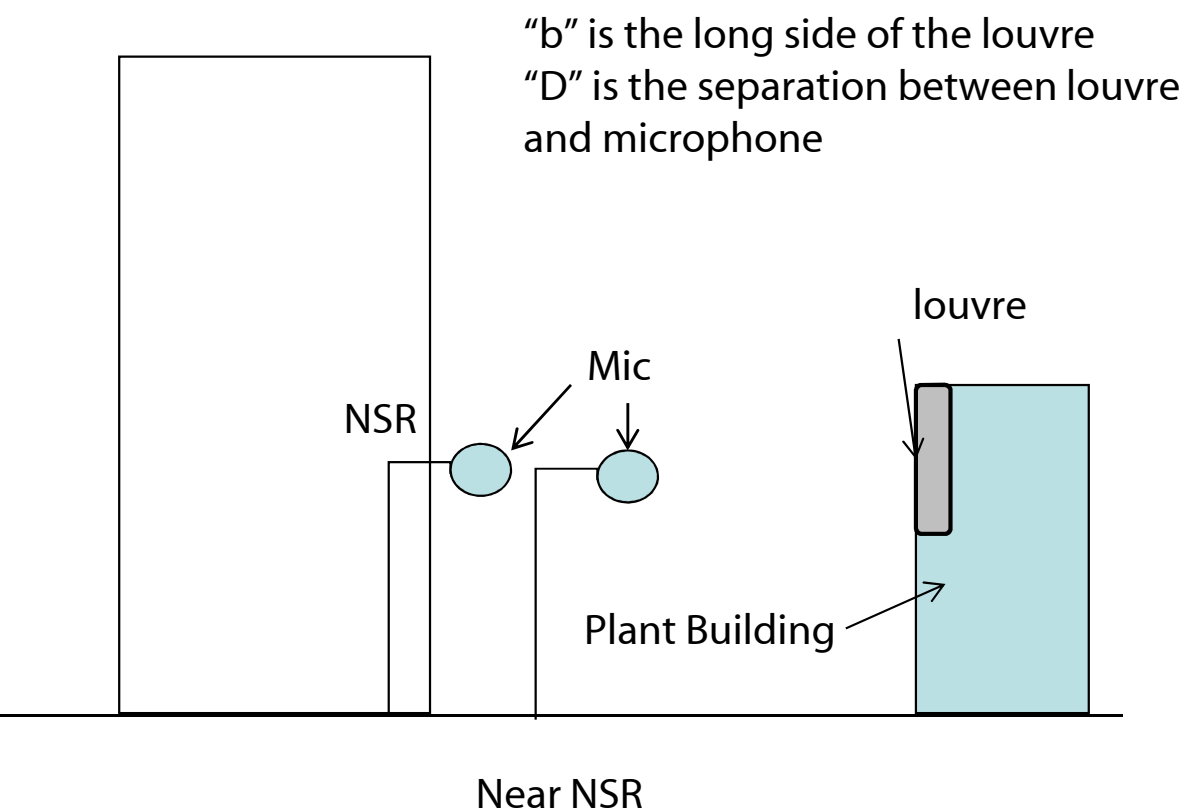
Summary of Testing Methodology

Method	Standard	No of repeated measurement	No of measurement point	Measurement distance, D	To Verify
Method 1 (NSR Method)	NCO - TM	3 sets of Leq 1min	Depend on number of NSRs nearby	At the most affected NSR or near NSR	ANL-5 or Background Prevailing
Method 2 (Far Field Method)	Basic Acoustic Principle	3 sets of Leq 1min	1 (for louvre/plant with uniform plane source)	$D \geq 2b$ and roundup to integer	ANL-5 or Background Prevailing
Method 3 (Near Field Method)	Developed based on ISO3746:2010	1 set of Leq 10s ^(a) /1min	Depend on the size of the louvre/plant and the measurement distance should follow guideline in ISO3746	At least 1m from the louvre opening/plant (unless otherwise specified)	ANL-5 or Background Prevailing

Note :

(a) If fixed plant items are operated at their noisiest operating modes and are steady during measurement, 10-second will be adopted for the duration of measurement.

Method 1 – Sound Pressure Level at NSR or Near NSR for louvre or Plant

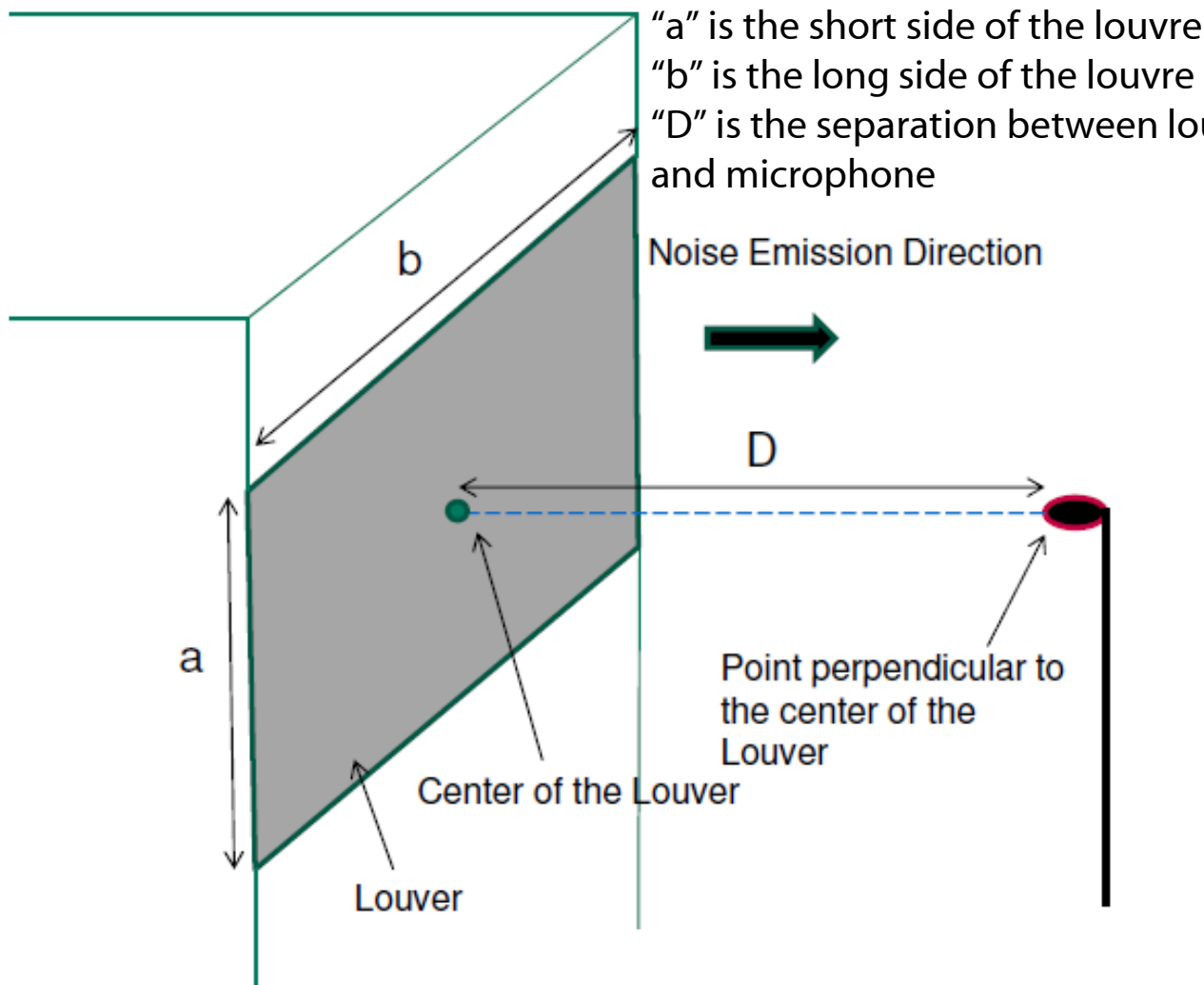


- Based on NCO - TM
- The locations of measurement points are depended on the site situation
- 3.0 dB façade correction should be considered if the location of measurement point is not at assessment point as defined in NCO-TM
- "D" must be greater than 2b and roundup to integer
- Detail calculation of the SPL should refer to the NCO-TM.
- Background noise level (BGL) should be taken for determination of background correction (BG)
- If the difference between the BGL and measured noise level (MNL) is less than 3.0 dB, BG should be capped to 3.0 dB

$$\text{Background corrected SPL} = \text{Mean } L_{Aeq1min} + BG - [20\log(D) + 8] \text{ (if applicable) + façade correction (if applicable)}$$

if the difference between the maximum and minimum $L_{eq} > 1\text{dB(A)}$; maximum L_{eq} would be adopted as a conservative approach

Method 2 – Far Field Sound Power Testing Method for louvre



- Based on basic acoustic principle
- "D" must be greater than 2b and roundup to integer, i.e.: $D \geq 2b$
- The microphone must point to the center of the louvre.
- At least 3 sets of L_{Aeq} , 1 min should be obtained
- Background noise level (BGL) should be taken for determination of background correction (BG)
- If the difference between the BGL and measured noise level (MNL) is less than 3.0 dB, BG should be capped to 3.0 dB

$$SWL \text{ (Sound Power Level)} = \text{Mean measured } L_{Aeq1min} + 20 \log (D, \text{center}) + 8 + BG$$

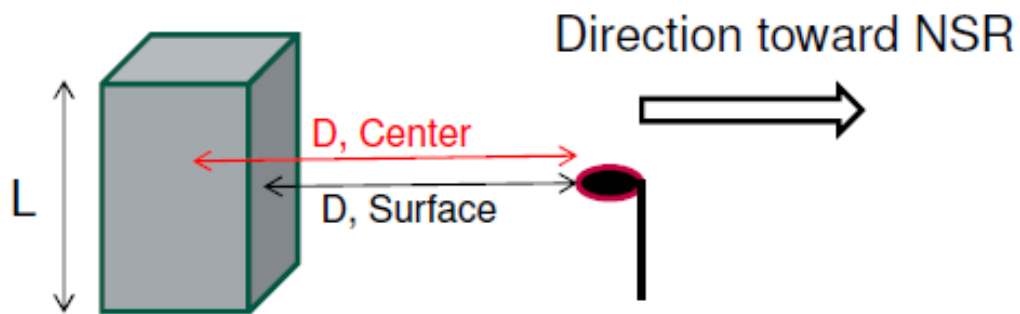
if the difference between the maximum and minimum $L_{eq} > 1 \text{ dB(A)}$; maximum L_{eq} would be adopted as a conservative approach

Method 2 – Far Field Sound Power Testing Method for Plant

“L” is the longest side of the plant item

“D, Center” is the separation between center of the plant item and microphone

“D, Surface” is the separation between surface of the plant item and microphone

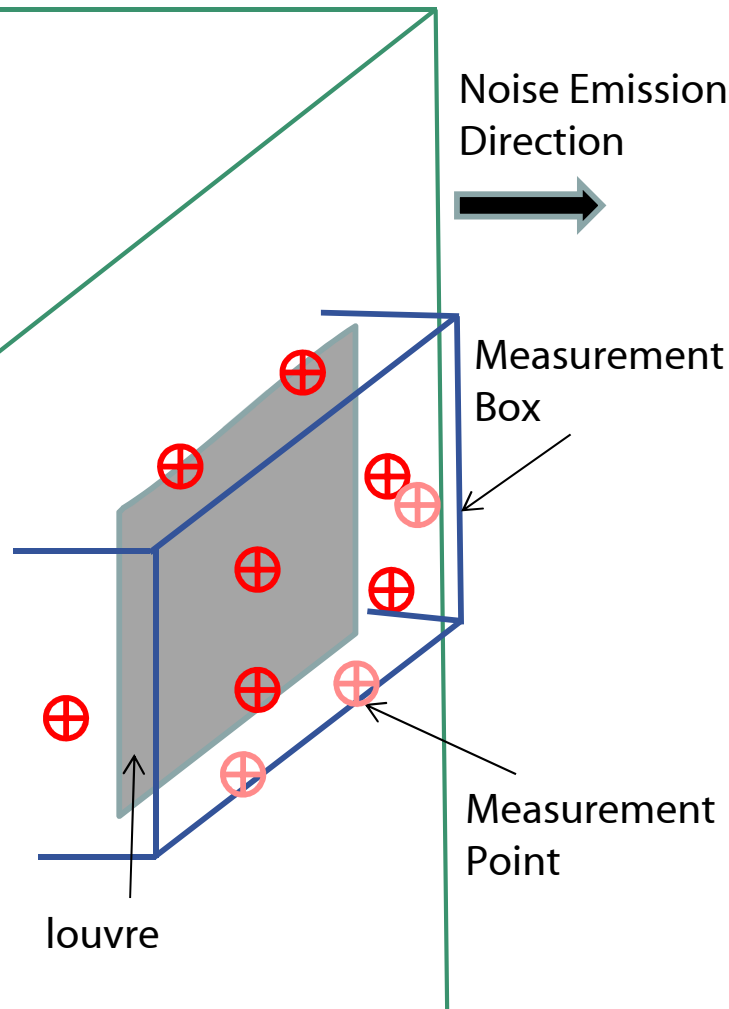


- “D, Surface” must be greater than twice of L (2L) and roundup to integer
- The microphone must be pointing to the center of the plant
- At least 3 sets of LAeq, 1min should be obtained at each measurement point.
- Background noise level (BGL) should be taken for determination of background correction (BG)
- If the difference between the BGL and measured noise level (MNL) is less than 3.0 dB, BG should be capped to 3.0 dB

$$\text{SWL (Sound Power Level)} = \text{Mean measured } L_{\text{Aeq}1\text{min}} + 20 \log (D, \text{center}) + 8 + \text{BG}$$

if the difference between the maximum and minimum Leq > 1dB(A); maximum Leq would be adopted as a conservative approach

Method 3 – Near Field Sound Power Testing Method for louvre



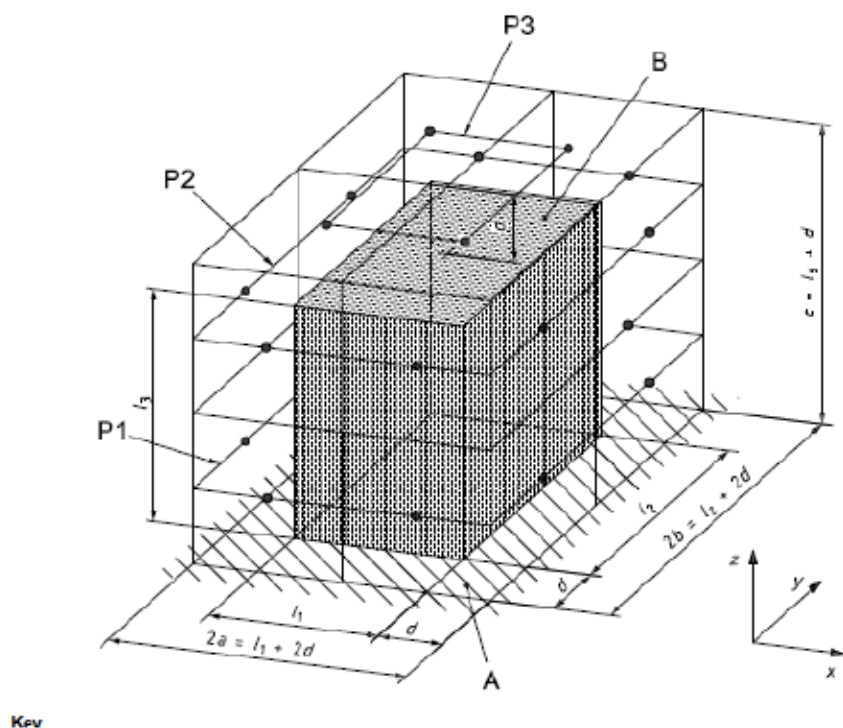
- Based on the principle of ISO3746 – 2010
- First step is to determine a hypothetical measurement surface /box with not less than 1m separation from the louvre.
- Second, determine the location of measurement point in accordance with the latest edition of ISO3746.
- Background noise level (BGL) should be taken at each measurement point for determination of background correction (K1A)
- At least 1 set of L_{eq} , 10s/1min should be obtained at each measurement point
- Extra localized microphone positions on the measurement surface in the region of high noise radiation would be considered following relevant procedures in ISO 3744
- If the difference between the BGL and measured noise level (MNL) is less than 3.0 dB, K1A should be capped to 3.0 dB
- The measurement distance would be reduced if necessary to obtain higher MNL for valid measurement results
- Details calculation of the SWL should refer to the latest edition of ISO3746.

$SWL = \text{Mean } L_{Aeq} \text{ over all measurement points} + 10 \log (\text{total surface area over the measurement box}) - K1A - K2A \text{ (sound absorption and reflection correction)}$

K1A refers to background noise correction factor

K2A refers to environmental correction for sound absorption and reflection

Method 3 – Near Field Sound Power Testing Method for Plant



- Based on ISO 3746
- The locations of measurement points are depended on the size of the plant, which cannot be easily generalised (See figure on the left for example).
- Extra localized microphone positions on the measurement surface in the region of high noise radiation would be considered following relevant procedures in ISO 3744
- If the difference between the BGL and measured noise level (MNL) is less than 3.0 dB, K1A should be capped to 3.0 dB
- The measurement distance would be reduced if necessary to obtain higher MNL for valid measurement results
- Detail calculation of the SWL should refer to the latest edition of ISO 3746.

SWL = Mean L_{Aeq} over all measurement points + 10 log (total surface area over the measurement box) - K1A - K2A (sound absorption and reflection correction)

K1A refers to background noise correction factor

K2A refers to environmental correction for sound absorption and reflection

End

Appendix A2 – Calibration Certificates



Calibration Certificate

Certificate No. **704083**

Page **1** of **4** Pages

Customer : 宏業承造有限公司

Address : 沙田火炭坳背灣街61-63號盈力工業大廈203室

Order No. : Q71682

Date of receipt : 8-May-17

Item Tested

Description : Sound Level Meter

Manufacturer : CASELLA

Model : CEL-63X

I.D. : CBSM0103

Serial No. : 5044655

Test Conditions

Date of Test : 11-May-17

Ambient Temperature : $(23 \pm 3)^{\circ}\text{C}$

Supply Voltage : --

Relative Humidity : $(50 \pm 25) \%$

Test Specifications

Calibration check.

Ref. Document/Procedure : Z01, IEC 61672, IEC 61260.

Test Results

All results were within the IEC 61672 Type 1 or IEC 61260 Class 1 specification.

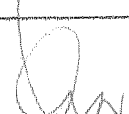
The results are shown in the attached page(s).

Main Test equipment used:

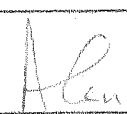
<u>Equipment No.</u>	<u>Description</u>	<u>Cert. No.</u>	<u>Traceable to</u>
S017	Multi-Function Generator	C170120	SCL-HKSAR
S240	Sound Level Calibrator	701036	NIM-PRC & SCL-HKSAR

The values given in this Calibration Certificate only relate to the values measured at the time of the test and any uncertainties quoted will not include allowance for the equipment long term drift, variations with environmental changes, vibration and shock during transportation, overloading, mis-handling, or the capability of any other laboratory to repeat the measurement. Hong Kong Calibration Ltd. shall not be liable for any loss or damage resulting from the use of the equipment.

The test equipment used for calibration are traceable to International System of Units (SI), or by reference to a natural constant.
The test results apply to the above Unit-Under-Test only

Calibrated by : 

Kin Wong

Approved by : 

Alan Chu

Date: 11-May-17

This Certificate is issued by:

Hong Kong Calibration Ltd.

Unit 8B, 24/F., Well Fung Industrial Centre, No. 58-76, Ta Chuen Ping Street, Kwai Chung, NT, Hong Kong.

Tel: 2425 8801 Fax: 2425 8846

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Calibration Certificate

Certificate No. 704083

Page 2 of 4 Pages

Results :

1. Self-generated noise: 0.2 dBA (Mfr's Spec (Electrical) $\leq$ 17.5 dBA)
2. Acoustical signal test

UUT Setting				Applied Value (dB)	UUT Reading (dB)
Range (dB)	Frequency Weighting	Time Weighting	Octave Filter		
0-140	A	F	OFF	94.0	93.8
		S	OFF		93.8
	C	F	OFF		94.0
	Z	F	OFF		93.8
	A	F	1/1		93.8
	A	F	1/3		93.8
	A	F	OFF	114.0	113.8
		S	OFF		113.8
	C	F	OFF		113.8
	Z	F	OFF		113.8
	A	F	1/1		113.9
	A	F	1/3		113.8

IEC 61672 Type 1 Spec. : $\pm$ 1.1 dB
Uncertainty : $\pm$ 0.3 dB

3 Electrical signal tests of frequency weightings (A weighting)

Frequency	Attenuation (dB)	IEC 61672 Type 1 Spec.
31.5 Hz	-39.4	- 39.4 dB, $\pm$ 2 dB
63 Hz	-26.2	- 26.2 dB, $\pm$ 1.5 dB
125 Hz	-16.1	- 16.1 dB, $\pm$ 1.5 dB
250 Hz	-8.7	- 8.6 dB, $\pm$ 1 dB
500 Hz	-3.2	- 3.2 dB, $\pm$ 1.4 dB
1 kHz	0.0 (Ref)	0 dB, $\pm$ 1.1 dB
2 kHz	+1.3	+ 1.2 dB, $\pm$ 1.6 dB
4 kHz	+0.9	+ 1.0 dB, $\pm$ 1.6 dB
8 kHz	-1.4	- 1.1 dB, + 2.1 dB $\sim$ -3.1 dB
16 kHz	-9.5	- 6.6 dB, + 3.5 dB $\sim$ -17.0 dB

Uncertainty : $\pm$ 0.1 dB



Calibration Certificate

Certificate No. 704083

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4. Frequency & Time weightings at 1 kHz

4.1 Frequency Weighting (Fast)

UUT Setting	Applied Value (dB)	UUT Reading (dB)	Difference (dB)	IEC 61672 Type 1 Spec.
A	94.0	93.8 (Ref.)	--	± 0.4 dB
C	94.0	94.0	+0.2	
Z	94.0	93.8	0.0	

4.2 Time Weighting (A-weighted)

UUT Setting	Applied Value (dB)	UUT Reading (dB)	Difference (dB)	IEC 61672 Type 1 Spec.
Fast	94.0	93.8 (Ref.)	--	± 0.3 dB
Slow	94.0	93.8	0.0	
Time-averaging	94.0	93.8	0.0	

Uncertainty : ± 0.1 dB

5. Filter Characteristics

5.1 1/1 - Octave Filter

Frequency	Attenuation (dB)	IEC 61260 Class 1 (dB)
125 Hz	-61.5	< - 61
250 Hz	-43.7	< - 42
500 Hz	-21.2	< - 17.5
707 Hz	-3.7	- 2 ~ - 5
1 kHz (Ref)	--	--
1.414 kHz	-3.8	- 2 ~ - 5
2 kHz	-24.2	< - 17.5
4 kHz	-66.0	< - 42
8 kHz	-62.1	< - 61

Uncertainty : ± 0.25 dB



Calibration Certificate

Certificate No. 704083

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5.2 1/3 – Octave Filter

Frequency	Attenuation (dB)	IEC 61260 Class 1 (dB)
326 Hz	-61.3	< - 61
530 Hz	-46.3	< - 42
772 Hz	-22.1	< - 17.5
891 Hz	-3.6	+ 0.3 ~ - 5.0
1 kHz (Ref)	- -	- -
1.122 kHz	-3.6	+ 0.3 ~ - 5.0
1.296 kHz	-23.3	< - 17.5
1.887 kHz	-50.7	< - 42
3.070 kHz	-72.5	< - 61

Uncertainty : ± 0.25 dB

Remarks : 1. UUT : Unit-Under-Test

2. The uncertainty claimed is for a confidence probability of not less than 95%.

3. Atmospheric Pressure : 1029 hPa

4. Preamplifier model : CEL-495 , S/N : 002374.

5. Firmware Version: 129-08

6. Power Supply Check: OK

7. The UUT was adjusted with the laboratory's sound calibrator at the reference sound pressure level before the calibration.

----- END -----



Calibration Certificate

Certificate No. 704084

Page 1 of 2 Pages

Customer : 宏業承造有限公司

Address : 沙田火炭坳背灣街61-63號盈力工業大廈203室

Order No. : Q71682

Date of receipt : 8-May-17

Item Tested

Description : Sound Level Calibrator

Manufacturer : Casella

I.D. : CBSM0103

Model : CEL-120/1

Serial No. : 5060836

Test Conditions

Date of Test : 11-May-17

Supply Voltage : --

Ambient Temperature : $(23 \pm 3)^{\circ}\text{C}$

Relative Humidity : $(50 \pm 25) \%$

Test Specifications

Calibration check.

Ref. Document/Procedure: IEC 60942, F21, Z02.

Test Results

All results were within the IEC 60942 Class 1 specification.

The results are shown in the attached page(s).

Main Test equipment used:

Equipment No.	Description	Cert. No.	Traceable to
S014	Spectrum Analyzer	605758	NIM-PRC & SCL-HKSAR
S240	Sound Level Calibrator	701036	NIM-PRC & SCL-HKSAR
S041	Universal Counter	607883	SCL-HKSAR

The values given in this Calibration Certificate only relate to the values measured at the time of the test and any uncertainties quoted will not include allowance for the equipment long term drift, variations with environmental changes, vibration and shock during transportation, overloading, mis-handling, or the capability of any other laboratory to repeat the measurement. Hong Kong Calibration Ltd. shall not be liable for any loss or damage resulting from the use of the equipment.

The test equipment used for calibration are traceable to International System of Units (SI), or by reference to a natural constant.
The test results apply to the above Unit-Under-Test only

Calibrated by :

Kin Wong

Approved by :

Alan Chu

This Certificate is issued by:

Hong Kong Calibration Ltd.

Unit 8B, 24/F., Well Fung Industrial Centre, No. 58-76, Ta Chuen Ping Street Kwai Chung, NT, Hong Kong.

Tel: 2425 8801 Fax: 2425 8646

Date: 11-May-17



Calibration Certificate

Certificate No. 704084

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Results :

1. Generated Sound Pressure Level

UUT Nominal Value (dB)	Measured Value (dB)	IEC 60942 Class 1 Spec.
94	94.2	± 0.4 dB
114	114.2	

Uncertainty : ± 0.2 dB

2. Short-term Level Fluctuation : 0.0 dB

IEC 60942 Class 1 Spec. : ± 0.1 dB

Uncertainty : ± 0.01 dB

3. Frequency

UUT Nominal Value (kHz)	Measured Value (kHz)	IEC 60942 Class 1 Spec.
1	1.000	± 1 %

Uncertainty : ± 3.6 x 10⁻⁶

4. Total Distortion : < 0.2 %

IEC 60942 Class 1 Spec. : < 3 %

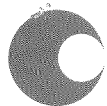
Uncertainty : ± 2.3 % of reading

Remark : 1. UUT : Unit-Under-Test

2. The uncertainty claimed is for a confidence probability of not less than 95%.

3. Atmospheric Pressure : 1029 hPa.

----- END -----



Calibration Certificate

Certificate No. **804865**

Page 1 of 4 Pages

Customer : ATAL Engineering Ltd**Address :** 13/F., Island Place Tower, 510 King's Road, North Point, H. K.**Order No. :** Q81893**Date of receipt :** 16-May-18**Item Tested****Description :** Sound Level Meter**Manufacturer :** CASELLA**I.D. :** --**Model :** CEL-63X**Serial No. :** 5044655**Test Conditions****Date of Test :** 18-May-18**Supply Voltage :** --**Ambient Temperature :** $(23 \pm 3)^{\circ}\text{C}$ **Relative Humidity :** $(50 \pm 25) \%$ **Test Specifications**

Calibration check.

Ref. Document/Procedure : Z01, IEC 61672, IEC 61260.

Test Results

All results were within the IEC 61672 Type 1 or IEC 61260 Class 1 specification. (where applicable)

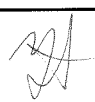
The results are shown in the attached page(s).

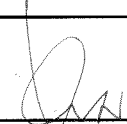
Main Test equipment used:

<u>Equipment No.</u>	<u>Description</u>	<u>Cert. No.</u>	<u>Traceable to</u>
S017	Multi-Function Generator	C170120	SCL-HKSAR
S240	Sound Level Calibrator	803357	NIM-PRC & SCL-HKSAR

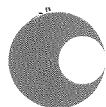
The values given in this Calibration Certificate only relate to the values measured at the time of the test and any uncertainties quoted will not include allowance for the equipment long term drift, variations with environmental changes, vibration and shock during transportation, overloading, mis-handling, or the capability of any other laboratory to repeat the measurement. Hong Kong Calibration Ltd. shall not be liable for any loss or damage resulting from the use of the equipment.

The test equipment used for calibration are traceable to International System of Units (SI), or by reference to a natural constant.
The test results apply to the above Unit-Under-Test only

Calibrated by : 
Elva Chong

Approved by : 
Kin Wong

Date: 18-May-18



Calibration Certificate

Certificate No. 804865

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Results :

1. Self-generated noise: 23.2 dBA

2. Acoustical signal test

UUT Setting				Applied Value (dB)	UUT Reading (dB)
Range (dB)	Frequency Weighting	Time Weighting	Octave Filter		
0-140	A	F	OFF	94.0	93.3
		S	OFF		93.3
	C	F	OFF		93.3
	Z	F	OFF		93.3
	A	F	1/1		93.3
	A	F	1/3		93.3
	A	F	OFF	114.0	113.4
		S	OFF		113.4
	C	F	OFF		113.4
	Z	F	OFF		113.4
	A	F	1/1		113.4
	A	F	1/3		113.4

IEC 61672 Type 1 Spec. : ± 1.1 dB

Uncertainty : ± 0.3 dB

3 Electrical signal tests of frequency weightings (A weighting)

Frequency	Attenuation (dB)	IEC 61672 Type 1 Spec.
31.5 Hz	-39.5	- 39.4 dB, ± 2 dB
63 Hz	-26.3	- 26.2 dB, ± 1.5 dB
125 Hz	-16.3	- 16.1 dB, ± 1.5 dB
250 Hz	-8.8	- 8.6 dB, ± 1 dB
500 Hz	-3.3	- 3.2 dB, ± 1.4 dB
1 kHz	0.0 (Ref)	0 dB, ± 1.1 dB
2 kHz	+1.2	+ 1.2 dB, ± 1.6 dB
4 kHz	+0.8	+ 1.0 dB, ± 1.6 dB
8 kHz	-1.5	- 1.1 dB, + 2.1 dB ~ -3.1 dB
16 kHz	-9.5	- 6.6 dB, + 3.5 dB ~ - 17.0 dB

Uncertainty : ± 0.1 dB



Calibration Certificate

Certificate No. 804865

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4. Frequency & Time weightings at 1 kHz

4.1 Frequency Weighting (Fast)

UUT Setting	Applied Value (dB)	UUT Reading (dB)	Difference (dB)	IEC 61672 Type 1 Spec.
A	94.0	94.0 (Ref.)	--	± 0.4 dB
C	94.0	94.0	0.0	
Z	94.0	94.0	0.0	

4.2 Time Weighting (A-weighted)

UUT Setting	Applied Value (dB)	UUT Reading (dB)	Difference (dB)	IEC 61672 Type 1 Spec.
Fast	94.0	94.0 (Ref.)	--	± 0.3 dB
Slow	94.0	94.0	0.0	
Time-averaging	94.0	94.0	0.0	

Uncertainty : ± 0.1 dB

5. Filter Characteristics

5.1 1/1 – Octave Filter

Frequency	Attenuation (dB)	IEC 61260 Class 1 (dB)
125 Hz	-61.4	< - 61
250 Hz	-43.7	< - 42
500 Hz	-21.2	< - 17.5
707 Hz	-3.7	- 2 ~ - 5
1 kHz (Ref)	--	--
1.414 kHz	-3.8	- 2 ~ - 5
2 kHz	-24.2	< - 17.5
4 kHz	-65.4	< - 42
8 kHz	-61.9	< - 61

Uncertainty : ± 0.25 dB



Calibration Certificate

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5.2 1/3 – Octave Filter

Frequency	Attenuation (dB)	IEC 61260 Class 1 (dB)
326 Hz	-61.3	< - 61
530 Hz	-46.3	< - 42
772 Hz	-22.1	< - 17.5
891 Hz	-3.6	+ 0.3 ~ - 5.0
1 kHz (Ref)	- -	- -
1.122 kHz	-3.7	+ 0.3 ~ - 5.0
1.296 kHz	-23.3	< - 17.5
1.887 kHz	-50.7	< - 42
3.070 kHz	-72.4	< - 61

Uncertainty : ± 0.25 dB

Remarks : 1. UUT : Unit-Under-Test

2. The uncertainty claimed is for a confidence probability of not less than 95%.

3. Atmospheric Pressure : 1 006 hPa

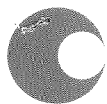
4. Preamplifier model : CEL-495 , S/N : 002374

5. Firmware Version: 129-08

6. Power Supply Check: OK

7. The UUT was adjusted with the supplied sound calibrator at the reference sound pressure level before the calibration.

----- END -----



Calibration Certificate

Certificate No. **804866**

Page **1** of **2** Pages

Customer : ATAL Engineering Ltd

Address : 13/F., Island Place Tower, 510 King's Road, North Point, H. K.

Order No. : Q81893

Date of receipt : 16-May-18

Item Tested

Description : Sound Level Calibrator

Manufacturer : Casella

I.D. : --

Model : CEL-120/1

Serial No. : 5060836

Test Conditions

Date of Test : 18-May-18

Supply Voltage : --

Ambient Temperature : $(23 \pm 3)^{\circ}\text{C}$

Relative Humidity : $(50 \pm 25) \%$

Test Specifications

Calibration check.

Ref. Document/Procedure: IEC 60942, F21, Z02.

Test Results

All results were within the IEC 60942 Class 1 specification.

The results are shown in the attached page(s).

Main Test equipment used:

<u>Equipment No.</u>	<u>Description</u>	<u>Cert. No.</u>	<u>Traceable to</u>
S014	Spectrum Analyzer	707126	NIM-PRC & SCL-HKSAR
S240	Sound Level Calibrator	803357	NIM-PRC & SCL-HKSAR
S041	Universal Counter	802061	SCL-HKSAR

The values given in this Calibration Certificate only relate to the values measured at the time of the test and any uncertainties quoted will not include allowance for the equipment long term drift, variations with environmental changes, vibration and shock during transportation, overloading, mis-handling, or the capability of any other laboratory to repeat the measurement. Hong Kong Calibration Ltd. shall not be liable for any loss or damage resulting from the use of the equipment.

The test equipment used for calibration are traceable to International System of Units (SI), or by reference to a natural constant.

The test results apply to the above Unit-Under-Test only

Calibrated by : 

Elva Chong

Approved by : 

Kin Wong

This Certificate is issued by:

Hong Kong Calibration Ltd.

Unit 8B, 24/F., Well Fung Industrial Centre, No. 58-76, Ta Chuen Ping Street, Kwai Chung, NT, Hong Kong.

Tel: 2425 8801 Fax: 2425 8646

Date: 18-May-18



Calibration Certificate

Certificate No. 804866

Page 2 of 2 Pages

Results :

1. Generated Sound Pressure Level

UUT Nominal Value (dB)	Measured Value (dB)	IEC 60942 Class 1 Spec.
94.0	94.3	± 0.4 dB
114.0	114.3	

Uncertainty : ± 0.2 dB

2. Short-term Level Fluctuation : 0.0 dB

IEC 60942 Class 1 Spec. : ± 0.1 dB

Uncertainty : ± 0.01 dB

3. Frequency

UUT Nominal Value (kHz)	Measured Value (kHz)	IEC 60942 Class 1 Spec.
1	1.000	± 1 %

Uncertainty : ± 3.6 x 10⁻⁶

4. Total Distortion : < 0.2 %

IEC 60942 Class 1 Spec. : < 4 %

Uncertainty : ± 2.3 % of reading

Remark : 1. UUT : Unit-Under-Test

2. The uncertainty claimed is for a confidence probability of not less than 95%.

3. Atmospheric Pressure : 1 006 hPa.

----- END -----

Manufacturer Calibration Certificate

The following instrument has been tested and calibrated to the manufacturer specifications.
The calibration is traceable in accordance with ISO/IEC 17025 covering all instrument functions.

- Device Type: **M2230 Measurement Microphone**
consisting of
MA220 Serial Number: 6240
Capsule Serial Number: 9498

- Certificate Issued: **10 January 2017**

- Certificate Number: **42745-6240-M2230**

- Results: **PASSED**
(for detailed report see next page)

Tested by: M.Frick

Signature:

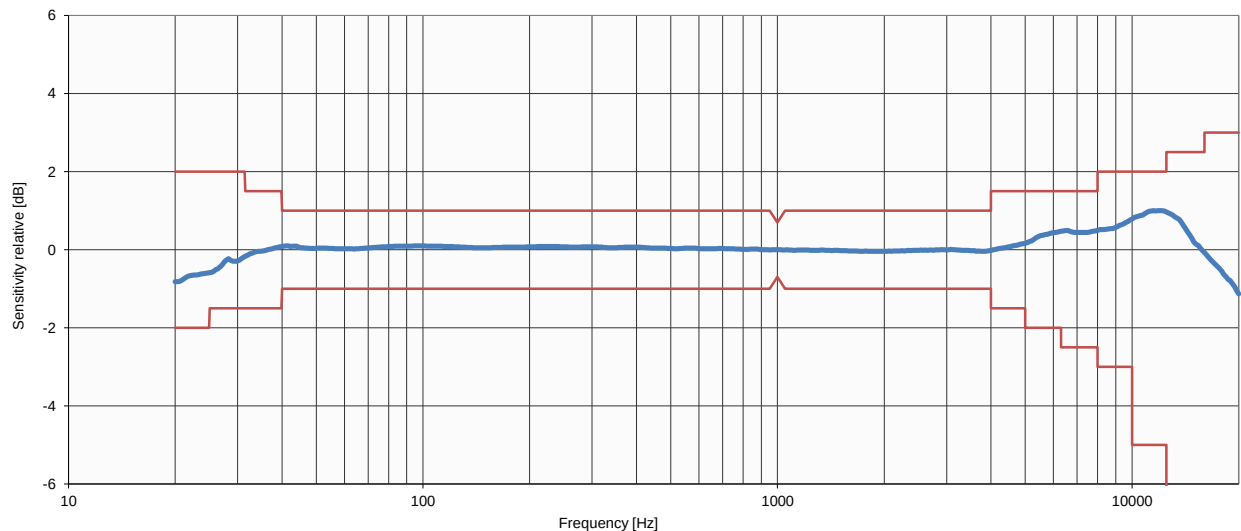
Stamp:

A handwritten signature in black ink is written over a rectangular stamp. The stamp contains the following text: 'NTi Audio AG', 'Im alten Riet 102', 'LI 9494 Schaan', and 'www.nti-audio.com'.

Date: 10 January 2017
Calibration of: M2230 Measurement Microphone
MA220 Serial Number: 6240
Capsule Serial Number: 9498

- Detailed Calibration Test Results:

Frequency response: **Class 1 acc. IEC 61672**



	actual	calibration uncertainty ¹
Sensitivity @ 1 kHz, 114 dB SPL	43.3 mV/Pa	±2.85%

- Test Conditions: Temperature: 27.2 °C ±0.5 °C
Relative Humidity: 39.5 % ±2%
Air Pressure: 95.94 kPa ±0.25 kPa

- Calibration Equipment Used:

- Norsonic Sound Calibrator, Type 1251, S/No. 30930
Last Calibration: 05.12.2016, Next Calibration: 05.12.2018
Calibrated by Metas, Switzerland
- NTi Audio FX100, S/No. 11094
Last Calibration: 16.08.2016, Next Calibration: 16.08.2017
Calibrated by NTi Audio meeting product specifications
- MTG MV203, S/No. 0630 / Mic Capsule, MK221 S/No. 16502
Last Calibration: 30.11.2015, Next Calibration: 30.11.2017
Calibrated by MTG, Germany

¹ The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a level of confidence of approximately 95%. The uncertainty evaluation has been carried out in accordance with the regulations of the GUM.

Manufacturer Calibration Certificate

The following instrument has been tested and calibrated to the manufacturer specifications.
The calibration is traceable in accordance with ISO/IEC 17025 covering all instrument functions.

- Device Type: **M2230 Measurement Microphone**
consisting of
MA220 Serial Number: 5011
Capsule Serial Number: 7698

- Certificate Issued: **24 March 2017**
- Certificate Number: **42818-5011-M2230**

- Results: **PASSED**
(for detailed report see next page)

Tested by: M.Frick

Signature:

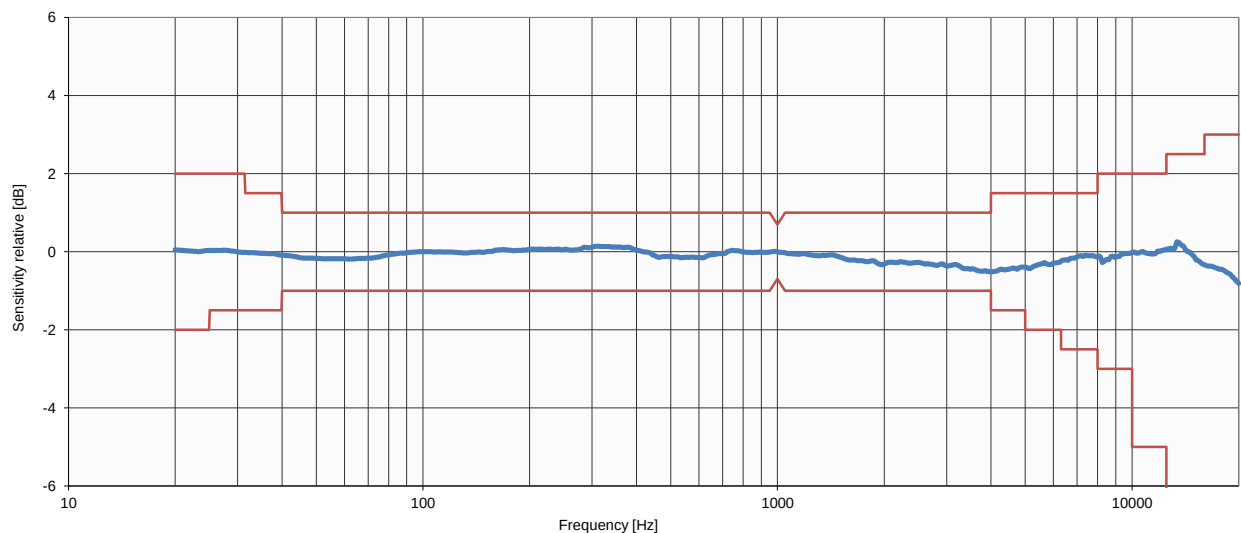
Stamp:

A handwritten signature in black ink is written over a rectangular stamp. The stamp contains the following text: 'NTi Audio AG', 'Im alten Riet 102', 'LI 9494 Schaan', and 'www.nti-audio.com'.

Date: 24 March 2017
Calibration of: M2230 Measurement Microphone
MA220 Serial Number: 5011
Capsule Serial Number: 7698

- Detailed Calibration Test Results:

Frequency response: **Class 1 acc. IEC 61672**



	actual	calibration uncertainty ¹
Sensitivity @ 1 kHz, 114 dB SPL	46.5 mV/Pa	±2.85%

- Test Conditions: Temperature: 21.1 °C ±0.5 °C
Relative Humidity: 47.2 % ±2%
Air Pressure: 97.4 kPa ±0.25 kPa

- Calibration Equipment Used:

- Norsonic Sound Calibrator, Type 1251, S/No. 30930
Last Calibration: 05.12.2016, Next Calibration: 05.12.2018
Calibrated by Metas, Switzerland
- NTi Audio FX100, S/No. 11094
Last Calibration: 16.08.2016, Next Calibration: 16.08.2017
Calibrated by NTi Audio meeting product specifications
- MTG MV203, S/No. 0630 / Mic Capsule, MK221 S/No. 16502
Last Calibration: 30.11.2015, Next Calibration: 30.11.2017
Calibrated by MTG, Germany

¹ The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a level of confidence of approximately 95%. The uncertainty evaluation has been carried out in accordance with the regulations of the GUM.

Manufacturer Calibration Certificate

The following instrument has been tested and calibrated to the manufacturer specifications.
The calibration is traceable in accordance with ISO/IEC 17025 covering all instrument functions.

- Device Type: **M2230 Measurement Microphone**
consisting of
MA220 Serial Number: 5617
Capsule Serial Number: 8507

- Certificate Issued: **24 March 2017**
- Certificate Number: **42818-5617-M2230**

- Results: **PASSED**
(for detailed report see next page)

Tested by: M.Frick

Signature:

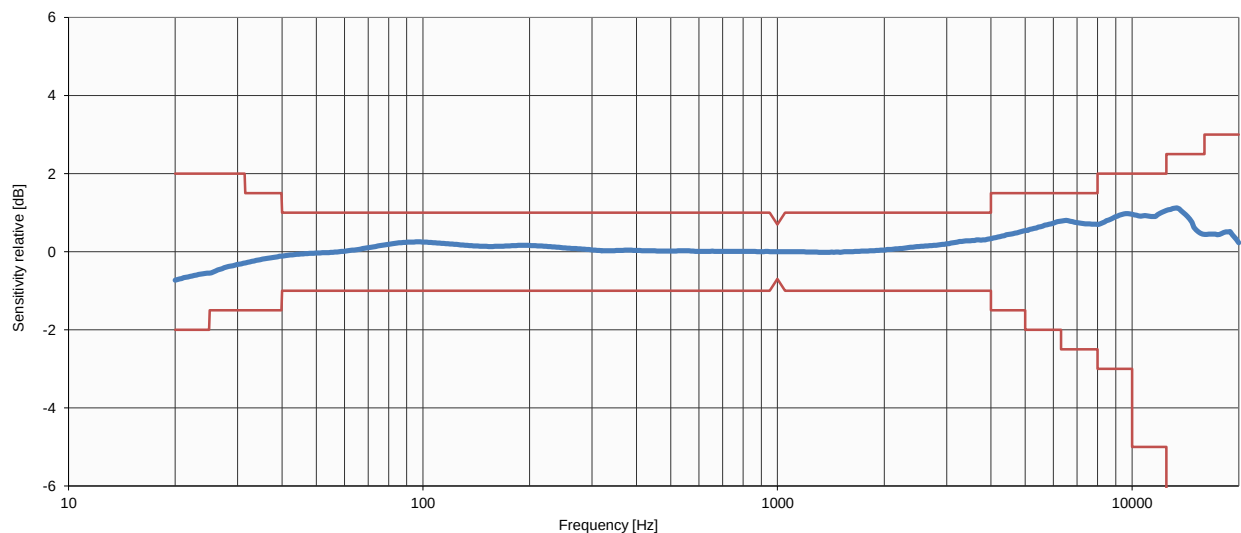
Stamp:

A handwritten signature in black ink is written over a rectangular stamp. The stamp contains the following text: 'NTi Audio AG', 'Im alten Riet 102', 'LI 9494 Schaan', and 'www.nti-audio.com'.

Date: 24 March 2017
Calibration of: M2230 Measurement Microphone
MA220 Serial Number: 5617
Capsule Serial Number: 8507

- Detailed Calibration Test Results:

Frequency response: **Class 1 acc. IEC 61672**



	actual	calibration uncertainty ¹
Sensitivity @ 1 kHz, 114 dB SPL	48.1 mV/Pa	±2.85%

- Test Conditions: Temperature: 24.6 °C ±0.5 °C
 Relative Humidity: 43.6 % ±2%
 Air Pressure: 97.65 kPa ±0.25 kPa

- Calibration Equipment Used:

- Norsonic Sound Calibrator, Type 1251, S/No. 30930
Last Calibration: 05.12.2016, Next Calibration: 05.12.2018
Calibrated by Metas, Switzerland
- NTi Audio FX100, S/No. 11094
Last Calibration: 16.08.2016, Next Calibration: 16.08.2017
Calibrated by NTi Audio meeting product specifications
- MTG MV203, S/No. 0630 / Mic Capsule, MK221 S/No. 16502
Last Calibration: 30.11.2015, Next Calibration: 30.11.2017
Calibrated by MTG, Germany

¹ The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a level of confidence of approximately 95%. The uncertainty evaluation has been carried out in accordance with the regulations of the GUM.



Calibration Chart

BSWA TECH

BSWA-IV-C021-03-0048A

Sound Calibrator model CA111.....
Serial Number 00317.....
Appearance OK.....
Power Supply 1.5V LR6 (AA battery) x2.....
Sound Pressure Level 93.92 / 114.04 dB.....
Frequency 1000.5 / 1000.5 Hz.....
THD (@1000Hz) 0.23 / 0.80 %.....

Copying and using select parts, or tampering with this document without the permission of BSWA is forbidden!

BSWA Technology Ltd.

www.bswa-tech.com

This equipment was calibrated at the following ambient conditions:

Temperature: 23 °C
Humidity: 35 %RH
Pressure: 1.025 hPa

This equipment is qualified!

C.R.

Calibrated

2016-11-15

Date



Appendix A3 – Fixed Plant Noise Summary

Day and Evening Time Fixed Plant Noise at NSR

NSR		Noise Source	Description	Louvre ID	Plant or Louvre? (P/L)	In operation? (Y/N)	Louvre Size (m)		Method ⁽ⁱⁱ⁾	Measurement Distance, D_M (m)	Surface Area of Measurement Box, S (m ²)	Measured L_{Aeq} [dB(A)] ⁽ⁱⁱⁱ⁾	Average Background L_{Aeq} [dB(A)]	Difference L_{Aeq} [dB(A)]	Background Corrected Measured $L_{Aeq,mea}$ [dB(A)] ^(iv)	Calculated SWL L_{Aeq} [dB(A)] ^(v)	Distance from Noise Source to NSR, D_N [m]	Correction for line of sight, LoS [dB(A)]	Corrected SPL at NSR [dB(A)]	Cumulative SPL at NSR [dB(A)]	Day and Evening Time Criteria [dB(A)]	Exceedance [dB(A)]
							Width	Height														
PH1	Sheung Tsuen Village House	Ventilation Shaft for N/B ⁽ⁱ⁾ and Building Service	Tunnel ventilation shaft	N1	L	Y	15.53	5.05	3	3	433.3	53.9	49.5	4.4	51.9	78	113	10	22	44	49	0
			FS control room	N2	L	Y	0.50	0.50	2	1	n/a	55	50.4	4.6	53.2	61	113	10	5			
			P&D pump and tank room	N3	L	Y	2.20	1.70	2	5	n/a	52.9	49.7	3.2	50.1	72	86	10	18			
			Air duct riser	N4	L	Y	5.70	2.50	3	1	59.1	57.7	51.7	6	56.4	74	86	10	20			
			Pressurization fan room	N5	L	Y	2.20	2.70	2	6	n/a	51.2	43.8	7.4	50.3	74	113	10	18			
			Tunnel ventilation shaft	E1	L	N ⁽ⁱ⁾	8.28	5.05	3	3	309.7	55.1	48.4	6.7	54.1	79	86	-				
			Tunnel ventilation shaft	E2	L	Y	8.28	5.05	3	3	309.7	54.8	50.5	4.3	52.8	78	106	10	22			
			Pressurization fan room	E3	L	Y	2.30	2.10	2	5	n/a	55	43.8	11.2	55	77	106	10	21			
			Smoke extract make-up fan room	E4	L	Y	1.80	2.40	2	5	n/a	60.8	43.8	17	60.8	83	100	10	28			
			Tunnel ventilation shaft	S1	L	N ⁽ⁱ⁾	15.15	5.05	3	3	426.9	55.7	50.5	5.2	54.1	80	81	-				
			UPS room	S2	L	Y	2.5	1.1	2	5	n/a	59.0	50.0	9	58.4	80	81	0	37			
			SER	S3	L	Y	0.70	0.70	2	2	n/a	50.3	45.3	5	48.6	63	81	0	20			
			MCC room	S4	L	Y	0.50	0.50	2	1	n/a	55.3	50.2	5.1	53.7	62	100	0	17			
			Smoke extraction fan room	S5	L	Y	5.80	1.90	3	1	53.8	64.1	45.3	18.8	64.1	81	81	0	38			
			ABBCS room	W1	L	Y	1.10	1.00	2	3	n/a	51.1	47.1	4	48.9	66	105	0	21			
			Smoke extraction fan room	W2	L	Y	7.00	1.90	3	1	60.9	66.9	47.5	19.4	66.9	85	86	0	41			
PH1a	Sheung Tsuen Village House	Ventilation Shaft for N/B ⁽ⁱ⁾ and Building Service	Tunnel ventilation shaft	N1	L	Y	15.53	5.05	3	3	433.3	53.9	49.5	4.4	51.9	78	95	10	23	46	49	0
			FS control room	N2	L	Y	0.50	0.50	2	1	n/a	55	50.4	4.6	53.2	61	95	10	6			
			P&D pump and tank room	N3	L	Y	2.20	1.70	2	5	n/a	52.9	49.7	3.2	50.1	72	69	10	20			
			Air duct riser	N4	L	Y	5.70	2.50	3	1	59.1	57.7	51.7	6	56.4	74	69	10	22			
			Pressurization fan room	N5	L	Y	2.20	2.70	2	6	n/a	51.2	43.8	7.4	50.3	74	95	10	19			
			Tunnel ventilation shaft	E1	L	N ⁽ⁱ⁾	8.28	5.05	3	3	309.7	55.1	48.4	6.7	54.1	79	69	-				
			Tunnel ventilation shaft	E2	L	Y	8.28	5.05	3	3	309.7	54.8	50.5	4.3	52.8	78	88	10	24			
			Pressurization fan room	E3	L	Y	2.30	2.10	2	5	n/a	55	43.8	11.2	55	77	88	10	23			
			Smoke extract make-up fan room	E4	L	Y	1.80	2.40	2	5	n/a	60.8	43.8	17	60.8	83	82	10	30			
			Tunnel ventilation shaft	S1	L	N ⁽ⁱ⁾	15.15	5.05	3	3	426.9	55.7	50.5	5.2	54.1	80	63	-				
			UPS room	S2	L	Y	2.5	1.1	2	5	n/a	59.0	50.0	9	58.4	80	63	0	39			
			SER	S3	L	Y	0.70	0.70	2	2	n/a	50.3	45.3	5	48.6	63	63	0	22			
			MCC room	S4	L	Y	0.50	0.50	2	1	n/a	55.3	50.2	5.1	53.7	62	82	0	19			
			Smoke extraction fan room	S5	L	Y	5.80	1.90	3	1	53.8	64.1	45.3	18.8	64.1	81	63	0	40			
			ABBCS room	W1	L	Y	1.10	1.00	2	3	n/a	51.1	47.1	4	48.9	66	86	0	22			
			Smoke extraction fan room	W2	L	Y	7.00	1.90	3	1	60.9	66.9	47.5	19.4	66.9	85	74	0	43			

NSR		Noise Source	Description	Louvre ID	Plant or Louvre? (P/L)	In operation? (Y/N)	Louvre Size (m)		Method ⁽ⁱⁱ⁾	Measure-ment Distance, D_M (m)	Surface Area of Measurement Box, S (m ²)	Measured L_{Aeq} [dB(A)] ⁽ⁱⁱⁱ⁾	Average Background L_{Aeq} [dB(A)]	Difference L_{Aeq} [dB(A)]	Background Corrected Measured $L_{Aeq,mea}$ [dB(A)] ^(vi)	Calculated SWL L_{Aeq} [dB(A)] ^(v)	Distance from Noise Source to NSR, D_N [m]	Correction for line of sight, LoS [dB(A)]	Corrected SPL at NSR [dB(A)]	Cumulative SPL at NSR [dB(A)]	Day and Evening Time Criteria [dB(A)]	Exceedance [dB(A)]
							Width	Height														
PH1b	Sheung Tsuen Village House	Ventilation Shaft for N/B ⁽ⁱ⁾ and Building Service	Tunnel ventilation shaft	N1	L	Y	15.53	5.05	3	3	433.3	53.9	49.5	4.4	51.9	78	116	10	22	42	49	0
			FS control room	N2	L	Y	0.50	0.50	2	1	n/a	55	50.4	4.6	53.2	61	120	10	4			
			P&D pump and tank room	N3	L	Y	2.20	1.70	2	5	n/a	52.9	49.7	3.2	50.1	72	97	10	17			
			Air duct riser	N4	L	Y	5.70	2.50	3	1	59.1	57.7	51.7	6	56.4	74	97	10	19			
			Pressurization fan room	N5	L	Y	2.20	2.70	2	6	n/a	51.2	43.8	7.4	50.3	74	120	10	17			
			Tunnel ventilation shaft	E1	L	N ⁽ⁱ⁾	8.28	5.05	3	3	309.7	55.1	48.4	6.7	54.1	79	92	-				
			Tunnel ventilation shaft	E2	L	Y	8.28	5.05	3	3	309.7	54.8	50.5	4.3	52.8	78	108	0	32			
			Pressurization fan room	E3	L	Y	2.30	2.10	2	5	n/a	55	43.8	11.2	55	77	118	0	31			
			Smoke extract make-up fan room	E4	L	Y	1.80	2.40	2	5	n/a	60.8	43.8	17	60.8	83	118	0	37			
			Tunnel ventilation shaft	S1	L	N ⁽ⁱ⁾	15.15	5.05	3	3	426.9	55.7	50.5	5.2	54.1	80	92	-				
			UPS room	S2	L	Y	2.5	1.1	2	5	n/a	59.0	50.0	9	58.4	80	102	0	35			
			SER	S3	L	Y	0.70	0.70	2	2	n/a	50.3	45.3	5	48.6	63	104	0	18			
			MCC room	S4	L	Y	0.50	0.50	2	1	n/a	55.3	50.2	5.1	53.7	62	108	0	16			
			Smoke extraction fan room	S5	L	Y	5.80	1.90	3	1	53.8	64.1	45.3	18.8	64.1	81	105	0	36			
			ABBCS room	W1	L	Y	1.10	1.00	2	3	n/a	51.1	47.1	4	48.9	66	122	10	9			
			Smoke extraction fan room	W2	L	Y	7.00	1.90	3	1	60.9	66.9	47.5	19.4	66.9	85	122	10	28			
PH4	Sheung Tsuen Village House	Ventilation Shaft for N/B ⁽ⁱ⁾ and Building Service	Tunnel ventilation shaft	N1	L	Y	15.53	5.05	3	3	433.3	53.9	49.5	4.4	51.9	78	86	0	34	42	49	0
			FS control room	N2	L	Y	0.50	0.50	2	1	n/a	55	50.4	4.6	53.2	61	80	0	18			
			P&D pump and tank room	N3	L	Y	2.20	1.70	2	5	n/a	52.9	49.7	3.2	50.1	72	110	0	26			
			Air duct riser	N4	L	Y	5.70	2.50	3	1	59.1	57.7	51.7	6	56.4	74	110	0	28			
			Pressurization fan room	N5	L	Y	2.20	2.70	2	6	n/a	51.2	43.8	7.4	50.3	74	80	0	31			
			Tunnel ventilation shaft	E1	L	N ⁽ⁱ⁾	8.28	5.05	3	3	309.7	55.1	48.4	6.7	54.1	79	114	-				
			Tunnel ventilation shaft	E2	L	Y	8.28	5.05	3	3	309.7	54.8	50.5	4.3	52.8	78	98	10	23			
			Pressurization fan room	E3	L	Y	2.30	2.10	2	5	n/a	55	43.8	11.2	55	77	82	10	24			
			Smoke extract make-up fan room	E4	L	Y	1.80	2.40	2	5	n/a	60.8	43.8	17	60.8	83	82	10	30			
			Tunnel ventilation shaft	S1	L	N ⁽ⁱ⁾	15.15	5.05	3	3	426.9	55.7	50.5	5.2	54.1	80	113	-				
			UPS room	S2	L	Y	2.5	1.1	2	5	n/a	59.0	50.0	9	58.4	80	96	10	25			
			SER	S3	L	Y	0.70	0.70	2	2	n/a	50.3	45.3	5	48.6	63	96	10	8			
			MCC room	S4	L	Y	0.50	0.50	2	1	n/a	55.3	50.2	5.1	53.7	62	108	10	6			
			Smoke extraction fan room	S5	L	Y	5.80	1.90	3	1	53.8	64.1	45.3	18.8	64.1	81	96	10	26			
			ABBCS room	W1	L	Y	1.10	1.00	2	3	n/a	51.1	47.1	4	48.9	66	90	0	22			
			Smoke extraction fan room	W2	L	Y	7.00	1.90	3	1	60.9	66.9	47.5	19.4	66.9	85	102	0	40			
			Tunnel ventilation shaft	N1	L	Y	15.53	5.05	3	3	433.3	53.9	49.5	4.4	51.9	78	99	0	33			
			FS control room	N2	L	Y	0.50	0.50	2	1	n/a	55	50.4	4.6	53.2	61	99	0	16			

NSR		Noise Source	Description	Louvre ID	Plant or Louvre? (P/L)	In operation? (Y/N)	Louvre Size (m)		Method ⁽ⁱⁱ⁾	Measurement Distance, D_M (m)	Surface Area of Measurement Box, S (m ²)	Measured L_{Aeq} [dB(A)] ⁽ⁱⁱⁱ⁾	Average Background L_{Aeq} [dB(A)]	Difference L_{Aeq} [dB(A)]	Background Corrected Measured $L_{Aeq,mea}$ [dB(A)] ^(v)	Calculated SWL L_{Aeq} [dB(A)] ^(v)	Distance from Noise Source to NSR, D_N [m]	Correction for line of sight, LoS [dB(A)]	Corrected SPL at NSR [dB(A)]	Cumulative SPL at NSR [dB(A)]	Day and Evening Time Criteria [dB(A)]	Exceedance [dB(A)]
							Width	Height														
PH4a	Sheung Tsuen Village House	Ventilation Shaft for N/B ⁽ⁱ⁾ and Building Service	P&D pump and tank room	N3	L	Y	2.20	1.70	2	5	n/a	52.9	49.7	3.2	50.1	72	120	0	25	38	49	0
			Air duct riser	N4	L	Y	5.70	2.50	3	1	59.1	57.7	51.7	6	56.4	74	120	0	27			
			Pressurization fan room	N5	L	Y	2.20	2.70	2	6	n/a	51.2	43.8	7.4	50.3	74	100	0	29			
			Tunnel ventilation shaft	E1	L	N ⁽ⁱ⁾	8.28	5.05	3	3	309.7	55.1	48.4	6.7	54.1	79	123	-				
			Tunnel ventilation shaft	E2	L	Y	8.28	5.05	3	3	309.7	54.8	50.5	4.3	52.8	78	103	10	23			
			Pressurization fan room	E3	L	Y	2.30	2.10	2	5	n/a	55	43.8	11.2	55	77	102	10	22			
			Smoke extract make-up fan room	E4	L	Y	1.80	2.40	2	5	n/a	60.8	43.8	17	60.8	83	103	10	28			
			Tunnel ventilation shaft	S1	L	N ⁽ⁱ⁾	15.15	5.05	3	3	426.9	55.7	50.5	5.2	54.1	80	131	-				
			UPS room	S2	L	Y	2.5	1.1	2	5	n/a	59.0	50.0	9	58.4	80	131	10	23			
			SER	S3	L	Y	0.70	0.70	2	2	n/a	50.3	45.3	5	48.6	63	131	10	6			
			MCC room	S4	L	Y	0.50	0.50	2	1	n/a	55.3	50.2	5.1	53.7	62	102	10	7			
			Smoke extraction fan room	S5	L	Y	5.80	1.90	3	1	53.8	64.1	45.3	18.8	64.1	81	131	10	24			
			ABBCS room	W1	L	Y	1.10	1.00	2	3	n/a	51.1	47.1	4	48.9	66	101	10	11			
			Smoke extraction fan room	W2	L	Y	7.00	1.90	3	1	60.9	66.9	47.5	19.4	66.9	85	125	10	28			

Remarks:

(i) Tunnel ventilation would only be operated for either northbound (N/B) or southbound (S/B) direction under normal scenario.

(ii) Method 2 Far field method for Louvres or Plants

Method 3 Near field method for Louvres or Plants

(iii) Results are averaged from the measured noise levels.

(iv) If the difference between the background and the measured noise level is less than 3.0 dB, background noise correction factor should be capped to 3.0 dB.

(v) The calculation of SWL is in accordance with the methodology described in **Section 3.1.1** and **Appendix A1** of the Report. For Method 3, K2A was not claimed in the calculation.

Day and Evening Time Fixed Plant Noise at NSR

NSR		Noise Source	Description	Louvre ID	Plant or Louvre? (P/L)	In operation? (Y/N)	Louvre Size (m)		Method (iii)	Measurement Distance, D_M (m)	Surface Area of Measurement Box, S (m ²)	Measured L_{Aeq} [dB(A)] (iii)	Average Background L_{Aeq} [dB(A)]	Difference L_{Aeq} [dB(A)]	Background Corrected Measured $L_{Aeq,mea}$ [dB(A)] (iv)	Calculated SWL L_{Aeq} [dB(A)] (v)	Distance from Noise Source to NSR, D_N [m]	Correction for line of sight, LoS [dB(A)]	Corrected SPL at NSR [dB(A)]	Cumulative SPL at NSR [dB(A)]	Day and Evening Time Criteria [dB(A)]	Exceedance [dB(A)]
							Width	Height														
PH1	Sheung Tsuen Village House	Ventilation Shaft for S/B ⁽ⁱ⁾ and Building Service	Tunnel ventilation shaft	N1	L	N ⁽ⁱ⁾	15.53	5.05	3	3	433.3	53.9	49.5	4.4	51.9	78	113	-		45	49	0
			FS control room	N2	L	Y	0.50	0.50	2	1	n/a	55	50.4	4.6	53.2	61	113	10	5			
			P&D pump and tank room	N3	L	Y	2.20	1.70	2	5	n/a	52.9	49.7	3.2	50.1	72	86	10	18			
			Air duct riser	N4	L	Y	5.70	2.50	3	1	59.1	57.7	51.7	6	56.4	74	86	10	20			
			Pressurization fan room	N5	L	Y	2.20	2.70	2	6	n/a	51.2	43.8	7.4	50.3	74	113	10	18			
			Tunnel ventilation shaft	E1	L	Y	8.28	5.05	3	3	309.7	55.1	48.4	6.7	54.1	79	86	10	25			
			Tunnel ventilation shaft	E2	L	N ⁽ⁱ⁾	8.28	5.05	3	3	309.7	54.8	50.5	4.3	52.8	78	106	-				
			Pressurization fan room	E3	L	Y	2.30	2.10	2	5	n/a	55	43.8	11.2	55	77	106	10	21			
			Smoke extract make-up fan room	E4	L	Y	1.80	2.40	2	5	n/a	60.8	43.8	17	60.8	83	100	10	28			
			Tunnel ventilation shaft	S1	L	Y	15.15	5.05	3	3	426.9	55.7	50.5	5.2	54.1	80	81	0	37			
			UPS room	S2	L	Y	2.5	1.1	2	5	n/a	59.0	50.0	9	58.4	80	81	0	37			
			SER	S3	L	Y	0.70	0.70	2	2	n/a	50.3	45.3	5	48.6	63	81	0	20			
			MCC room	S4	L	Y	0.50	0.50	2	1	n/a	55.3	50.2	5.1	53.7	62	100	0	17			
			Smoke extraction fan room	S5	L	Y	5.80	1.90	3	1	53.8	64.1	45.3	18.8	64.1	81	81	0	38			
			ABBCS room	W1	L	Y	1.10	1.00	2	3	n/a	51.1	47.1	4	48.9	66	105	0	21			
			Smoke extraction fan room	W2	L	Y	7.00	1.90	3	1	60.9	66.9	47.5	19.4	66.9	85	86	0	41			
PH1a	Sheung Tsuen Village House	Ventilation Shaft for S/B ⁽ⁱ⁾ and Building Service	Tunnel ventilation shaft	N1	L	N ⁽ⁱ⁾	15.53	5.05	3	3	433.3	53.9	49.5	4.4	51.9	78	95	-		47	49	0
			FS control room	N2	L	Y	0.50	0.50	2	1	n/a	55	50.4	4.6	53.2	61	95	10	6			
			P&D pump and tank room	N3	L	Y	2.20	1.70	2	5	n/a	52.9	49.7	3.2	50.1	72	69	10	20			
			Air duct riser	N4	L	Y	5.70	2.50	3	1	59.1	57.7	51.7	6	56.4	74	69	10	22			
			Pressurization fan room	N5	L	Y	2.20	2.70	2	6	n/a	51.2	43.8	7.4	50.3	74	95	10	19			
			Tunnel ventilation shaft	E1	L	Y	8.28	5.05	3	3	309.7	55.1	48.4	6.7	54.1	79	69	10	27			
			Tunnel ventilation shaft	E2	L	N ⁽ⁱ⁾	8.28	5.05	3	3	309.7	54.8	50.5	4.3	52.8	78	88	-				
			Pressurization fan room	E3	L	Y	2.30	2.10	2	5	n/a	55	43.8	11.2	55	77	88	10	23			
			Smoke extract make-up fan room	E4	L	Y	1.80	2.40	2	5	n/a	60.8	43.8	17	60.8	83	82	10	30			
			Tunnel ventilation shaft	S1	L	Y	15.15	5.05	3	3	426.9	55.7	50.5	5.2	54.1	80	63	0	39			
			UPS room	S2	L	Y	2.5	1.1	2	5	n/a	59.0	50.0	9	58.4	80	63	0	39			
			SER	S3	L	Y	0.70	0.70	2	2	n/a	50.3	45.3	5	48.6	63	63	0	22			
			MCC room	S4	L	Y	0.50	0.50	2	1	n/a	55.3	50.2	5.1	53.7	62	82	0	19			
			Smoke extraction fan room	S5	L	Y	5.80	1.90	3	1	53.8	64.1	45.3	18.8	64.1	81	63	0	40			
			ABBCS room	W1	L	Y	1.10	1.00	2	3	n/a	51.1	47.1	4	48.9	66	86	0	22			
			Smoke extraction fan room	W2	L	Y	7.00	1.90	3	1	60.9	66.9	47.5	19.4	66.9	85	74	0	43			

NSR		Noise Source	Description	Louvre ID	Plant or Louvre? (P/L)	In operation? (Y/N)	Louvre Size (m)		Method ⁽ⁱⁱ⁾	Measurement Distance, D_M (m)	Surface Area of Measurement Box, S (m ²)	Measured L_{Aeq} [dB(A)] ⁽ⁱⁱⁱ⁾	Average Background L_{Aeq} [dB(A)]	Difference L_{Aeq} [dB(A)]	Background Corrected Measured $L_{Aeq,mea}$ [dB(A)] ^(vi)	Calculated SWL L_{Aeq} [dB(A)] ^(v)	Distance from Noise Source to NSR, D_N [m]	Correction for line of sight, LoS [dB(A)]	Corrected SPL at NSR [dB(A)]	Cumulative SPL at NSR [dB(A)]	Day and Evening Time Criteria [dB(A)]	Exceedance [dB(A)]
						Width	Height															
PH1b	Sheung Tsuen Village House	Ventilation Shaft for S/B ⁽ⁱ⁾ and Building Service	Tunnel ventilation shaft	N1	L	N ⁽ⁱ⁾	15.53	5.05	3	3	433.3	53.9	49.5	4.4	51.9	78	116	-		43	49	0
			FS control room	N2	L	Y	0.50	0.50	2	1	n/a	55	50.4	4.6	53.2	61	120	10	4			
			P&D pump and tank room	N3	L	Y	2.20	1.70	2	5	n/a	52.9	49.7	3.2	50.1	72	97	10	17			
			Air duct riser	N4	L	Y	5.70	2.50	3	1	59.1	57.7	51.7	6	56.4	74	97	10	19			
			Pressurization fan room	N5	L	Y	2.20	2.70	2	6	n/a	51.2	43.8	7.4	50.3	74	120	10	17			
			Tunnel ventilation shaft	E1	L	Y	8.28	5.05	3	3	309.7	55.1	48.4	6.7	54.1	79	92	0	35			
			Tunnel ventilation shaft	E2	L	N ⁽ⁱ⁾	8.28	5.05	3	3	309.7	54.8	50.5	4.3	52.8	78	108	-				
			Pressurization fan room	E3	L	Y	2.30	2.10	2	5	n/a	55	43.8	11.2	55	77	118	0	31			
			Smoke extract make-up fan room	E4	L	Y	1.80	2.40	2	5	n/a	60.8	43.8	17	60.8	83	118	0	37			
			Tunnel ventilation shaft	S1	L	Y	15.15	5.05	3	3	426.9	55.7	50.5	5.2	54.1	80	92	0	36			
			UPS room	S2	L	Y	2.5	1.1	2	5	n/a	59.0	50.0	9	58.4	80	102	0	35			
			SER	S3	L	Y	0.70	0.70	2	2	n/a	50.3	45.3	5	48.6	63	104	0	18			
			MCC room	S4	L	Y	0.50	0.50	2	1	n/a	55.3	50.2	5.1	53.7	62	108	0	16			
			Smoke extraction fan room	S5	L	Y	5.80	1.90	3	1	53.8	64.1	45.3	18.8	64.1	81	105	0	36			
			ABBCS room	W1	L	Y	1.10	1.00	2	3	n/a	51.1	47.1	4	48.9	66	122	10	9			
			Smoke extraction fan room	W2	L	Y	7.00	1.90	3	1	60.9	66.9	47.5	19.4	66.9	85	122	10	28			
PH4	Sheung Tsuen Village House	Ventilation Shaft for S/B ⁽ⁱ⁾ and Building Service	Tunnel ventilation shaft	N1	L	N ⁽ⁱ⁾	15.53	5.05	3	3	433.3	53.9	49.5	4.4	51.9	78	86	-		42	49	0
			FS control room	N2	L	Y	0.50	0.50	2	1	n/a	55	50.4	4.6	53.2	61	80	0	18			
			P&D pump and tank room	N3	L	Y	2.20	1.70	2	5	n/a	52.9	49.7	3.2	50.1	72	110	0	26			
			Air duct riser	N4	L	Y	5.70	2.50	3	1	59.1	57.7	51.7	6	56.4	74	110	0	28			
			Pressurization fan room	N5	L	Y	2.20	2.70	2	6	n/a	51.2	43.8	7.4	50.3	74	80	0	31			
			Tunnel ventilation shaft	E1	L	Y	8.28	5.05	3	3	309.7	55.1	48.4	6.7	54.1	79	114	10	23			
			Tunnel ventilation shaft	E2	L	N ⁽ⁱ⁾	8.28	5.05	3	3	309.7	54.8	50.5	4.3	52.8	78	98	-				
			Pressurization fan room	E3	L	Y	2.30	2.10	2	5	n/a	55	43.8	11.2	55	77	82	10	24			
			Smoke extract make-up fan room	E4	L	Y	1.80	2.40	2	5	n/a	60.8	43.8	17	60.8	83	82	10	30			
			Tunnel ventilation shaft	S1	L	Y	15.15	5.05	3	3	426.9	55.7	50.5	5.2	54.1	80	113	10	24			
			UPS room	S2	L	Y	2.5	1.1	2	5	n/a	59.0	50.0	9	58.4	80	96	10	25			
			SER	S3	L	Y	0.70	0.70	2	2	n/a	50.3	45.3	5	48.6	63	96	10	8			
			MCC room	S4	L	Y	0.50	0.50	2	1	n/a	55.3	50.2	5.1	53.7	62	108	10	6			
			Smoke extraction fan room	S5	L	Y	5.80	1.90	3	1	53.8	64.1	45.3	18.8	64.1	81	96	10	26			
			ABBCS room	W1	L	Y	1.10	1.00	2	3	n/a	51.1	47.1	4	48.9	66	90	0	22			
			Smoke extraction fan room	W2	L	Y	7.00	1.90	3	1	60.9	66.9	47.5	19.4	66.9	85	102	0	40			
			Tunnel ventilation shaft	N1	L	N ⁽ⁱ⁾	15.53	5.05	3	3	433.3	53.9	49.5	4.4	51.9	78	99	-				
			FS control room	N2	L	Y	0.50	0.50	2	1	n/a	55	50.4	4.6	53.2	61	99	0	16			

NSR		Noise Source	Description	Louvre ID	Plant or Louvre? (P/L)	In operation? (Y/N)	Louvre Size (m)		Method ⁽ⁱⁱ⁾	Measure-ment Distance, D_M (m)	Surface Area of Measurement Box, S (m ²)	Measured L_{Aeq} [dB(A)] ⁽ⁱⁱⁱ⁾	Average Background L_{Aeq} [dB(A)]	Difference L_{Aeq} [dB(A)]	Background Corrected Measured $L_{Aeq,mea}$ [dB(A)] ^(v)	Calculated SWL L_{Aeq} [dB(A)] ^(iv)	Distance from Noise Source to NSR, D_N [m]	Correction for line of sight, LoS [dB(A)]	Corrected SPL at NSR [dB(A)]	Cumulative SPL at NSR [dB(A)]	Day and Evening Time Criteria [dB(A)]	Exceedance [dB(A)]
							Width	Height														
PH4a	Sheung Tsuen Village House	Ventilation Shaft for S/B ⁽ⁱ⁾ and Building Service	P&D pump and tank room	N3	L	Y	2.20	1.70	2	5	n/a	52.9	49.7	3.2	50.1	72	120	0	25	36	49	0
			Air duct riser	N4	L	Y	5.70	2.50	3	1	59.1	57.7	51.7	6	56.4	74	120	0	27			
			Pressurization fan room	N5	L	Y	2.20	2.70	2	6	n/a	51.2	43.8	7.4	50.3	74	100	0	29			
			Tunnel ventilation shaft	E1	L	Y	8.28	5.05	3	3	309.7	55.1	48.4	6.7	54.1	79	123	10	22			
			Tunnel ventilation shaft	E2	L	N ⁽ⁱ⁾	8.28	5.05	3	3	309.7	54.8	50.5	4.3	52.8	78	103	-				
			Pressurization fan room	E3	L	Y	2.30	2.10	2	5	n/a	55	43.8	11.2	55	77	102	10	22			
			Smoke extract make-up fan room	E4	L	Y	1.80	2.40	2	5	n/a	60.8	43.8	17	60.8	83	103	10	28			
			Tunnel ventilation shaft	S1	L	Y	15.15	5.05	3	3	426.9	55.7	50.5	5.2	54.1	80	131	10	23			
			UPS room	S2	L	Y	2.5	1.1	2	5	n/a	59.0	50.0	9	58.4	80	131	10	23			
			SER	S3	L	Y	0.70	0.70	2	2	n/a	50.3	45.3	5	48.6	63	131	10	6			
			MCC room	S4	L	Y	0.50	0.50	2	1	n/a	55.3	50.2	5.1	53.7	62	102	10	7			
			Smoke extraction fan room	S5	L	Y	5.80	1.90	3	1	53.8	64.1	45.3	18.8	64.1	81	131	10	24			
			ABBCS room	W1	L	Y	1.10	1.00	2	3	n/a	51.1	47.1	4	48.9	66	101	10	11			
			Smoke extraction fan room	W2	L	Y	7.00	1.90	3	1	60.9	66.9	47.5	19.4	66.9	85	125	10	28			

Remarks:

(i) Tunnel ventilation would only be operated for either northbound (N/B) or southbound (S/B) direction under normal scenario.

(ii) Method 2 Far field method for Louvres or Plants

Method 3 Near field method for Louvres or Plants

(iii) Results are averaged from the measured noise levels.

(iv) If the difference between the background and the measured noise level is less than 3.0 dB, background noise correction factor should be capped to 3.0 dB.

(v) The calculation of SWL is in accordance with the methodology described in **Section 3.1.1** and **Appendix A1** of the Report. For Method 3, K2A was not claimed in the calculation.

Night Time Fixed Plant Noise at NSR

NSR		Noise Source	Description	Louvre ID	Plant or Louvre? (P/L)	In operation? (Y/N)	Louvre Size (m)		Method ⁽ⁱⁱ⁾	Measure-ment Distance, D_M (m)	Surface Area of Measurement Box, S (m ²)	Measured L_{Aeq} [dB(A)] ⁽ⁱⁱⁱ⁾	Average Background L_{Aeq} [dB(A)]	Difference L_{Aeq} [dB(A)]	Background Corrected Measured $L_{Aeq,mea}$ [dB(A)] ^(iv)	Calculated SWL L_{Aeq} [dB(A)] ^(v)	Distance from Noise Source to NSR, D_N [m]	Correction for line of sight, LoS [dB(A)]	Corrected SPL at NSR [dB(A)]	Cumulative SPL at NSR [dB(A)]	Night Time Criteria [dB(A)]	Exceedance [dB(A)]
							Width	Height														
PH1	Sheung Tsuen Village House	Ventilation Shaft for N/B ⁽ⁱ⁾ and Building Service	Tunnel ventilation shaft	N1	L	Y	15.53	5.05	3	3	433.3	53.9	49.5	4.4	51.9	78	113	10	22	29	43	0
			FS control room	N2	L	Y	0.50	0.50	2	1	n/a	55	50.4	4.6	53.2	61	113	10	5			
			P&D pump and tank room	N3	L	Y	2.20	1.70	2	5	n/a	52.9	49.7	3.2	50.1	72	86	10	18			
			Air duct riser	N4	L	Y	5.70	2.50	3	1	59.1	57.7	51.7	6	56.4	74	86	10	20			
			Pressurization fan room	N5	L	N ⁽ⁱⁱ⁾	2.20	2.70	2	6	n/a	51.2	43.8	7.4	50.3	74	113	-				
			Tunnel ventilation shaft	E1	L	N ⁽ⁱ⁾	8.28	5.05	3	3	309.7	55.1	48.4	6.7	54.1	79	86	-				
			Tunnel ventilation shaft	E2	L	Y	8.28	5.05	3	3	309.7	54.8	50.5	4.3	52.8	78	106	10	22			
			Pressurization fan room	E3	L	N ⁽ⁱⁱ⁾	2.30	2.10	2	5	n/a	55	43.8	11.2	55	77	106	-				
			Smoke extract make-up fan room	E4	L	N ⁽ⁱⁱ⁾	1.80	2.40	2	5	n/a	60.8	43.8	17	60.8	83	100	-				
			Tunnel ventilation shaft	S1	L	N ⁽ⁱ⁾	15.15	5.05	3	3	426.9	55.7	50.5	5.2	54.1	80	81	-				
			UPS room	S2	L	N ⁽ⁱⁱ⁾	2.5	1.1	2	5	n/a	59.0	50.0	9	58.4	80	81	-				
			SER	S3	L	Y	0.70	0.70	2	2	n/a	50.3	45.3	5	48.6	63	81	0	20			
			MCC room	S4	L	Y	0.50	0.50	2	1	n/a	55.3	50.2	5.1	53.7	62	100	0	17			
			Smoke extraction fan room	S5	L	N ⁽ⁱⁱ⁾	5.80	1.90	3	1	53.8	64.1	45.3	18.8	64.1	81	81	-				
			ABBCS room	W1	L	Y	1.10	1.00	2	3	n/a	51.1	47.1	4	48.9	66	105	0	21			
			Smoke extraction fan room	W2	L	N ⁽ⁱⁱ⁾	7.00	1.90	3	1	60.9	66.9	47.5	19.4	66.9	85	86	-				
PH1a	Sheung Tsuen Village House	Ventilation Shaft for N/B ⁽ⁱ⁾ and Building Service	Tunnel ventilation shaft	N1	L	Y	15.53	5.05	3	3	433.3	53.9	49.5	4.4	51.9	78	95	10	23	30	43	0
			FS control room	N2	L	Y	0.50	0.50	2	1	n/a	55	50.4	4.6	53.2	61	95	10	6			
			P&D pump and tank room	N3	L	Y	2.20	1.70	2	5	n/a	52.9	49.7	3.2	50.1	72	69	10	20			
			Air duct riser	N4	L	Y	5.70	2.50	3	1	59.1	57.7	51.7	6	56.4	74	69	10	22			
			Pressurization fan room	N5	L	N ⁽ⁱⁱ⁾	2.20	2.70	2	6	n/a	51.2	43.8	7.4	50.3	74	95	-				
			Tunnel ventilation shaft	E1	L	N ⁽ⁱ⁾	8.28	5.05	3	3	309.7	55.1	48.4	6.7	54.1	79	69	-				
			Tunnel ventilation shaft	E2	L	Y	8.28	5.05	3	3	309.7	54.8	50.5	4.3	52.8	78	88	10	24			
			Pressurization fan room	E3	L	N ⁽ⁱⁱ⁾	2.30	2.10	2	5	n/a	55	43.8	11.2	55	77	88	-				
			Smoke extract make-up fan room	E4	L	N ⁽ⁱⁱ⁾	1.80	2.40	2	5	n/a	60.8	43.8	17	60.8	83	82	-				
			Tunnel ventilation shaft	S1	L	N ⁽ⁱ⁾	15.15	5.05	3	3	426.9	55.7	50.5	5.2	54.1	80	63	-				
			UPS room	S2	L	N ⁽ⁱⁱ⁾	2.5	1.1	2	5	n/a	59.0	50.0	9	58.4	80	63	-				
			SER	S3	L	Y	0.70	0.70	2	2	n/a	50.3	45.3	5	48.6	63	63	0	22			
			MCC room	S4	L	Y	0.50	0.50	2	1	n/a	55.3	50.2	5.1	53.7	62	82	0	19			
			Smoke extraction fan room	S5	L	N ⁽ⁱⁱ⁾	5.80	1.90	3	1	53.8	64.1	45.3	18.8	64.1	81	63	-				
			ABBCS room	W1	L	Y	1.10	1.00	2	3	n/a	51.1	47.1	4	48.9	66	86	0	22			
			Smoke extraction fan room	W2	L	N ⁽ⁱⁱ⁾	7.00	1.90	3	1	60.9	66.9	47.5	19.4	66.9	85	74	-				

NSR		Noise Source	Description	Louvre ID	Plant or Louvre? (P/L)	In operation? (Y/N)	Louvre Size (m)		Method ⁽ⁱⁱ⁾	Measurement Distance, D_M (m)	Surface Area of Measurement Box, S (m ²)	Measured L_{Aeq} [dB(A)] ⁽ⁱⁱⁱ⁾	Average Background L_{Aeq} [dB(A)]	Difference L_{Aeq} [dB(A)]	Background Corrected Measured $L_{Aeq,mea}$ [dB(A)] ^(iv)	Calculated SWL L_{Aeq} [dB(A)] ^(v)	Distance from Noise Source to NSR, D_N [m]	Correction for line of sight, LoS [dB(A)]	Corrected SPL at NSR [dB(A)]	Cumulative SPL at NSR [dB(A)]	Night Time Criteria [dB(A)]	Exceedance [dB(A)]
							Width	Height														
PH1b	Sheung Tsuen Village House	Ventilation Shaft for N/B ⁽ⁱ⁾ and Building Service	Tunnel ventilation shaft	N1	L	Y	15.53	5.05	3	3	433.3	53.9	49.5	4.4	51.9	78	116	10	22	33	43	0
			FS control room	N2	L	Y	0.50	0.50	2	1	n/a	55	50.4	4.6	53.2	61	120	10	4			
			P&D pump and tank room	N3	L	Y	2.20	1.70	2	5	n/a	52.9	49.7	3.2	50.1	72	97	10	17			
			Air duct riser	N4	L	Y	5.70	2.50	3	1	59.1	57.7	51.7	6	56.4	74	97	10	19			
			Pressurization fan room	N5	L	N ⁽ⁱⁱ⁾	2.20	2.70	2	6	n/a	51.2	43.8	7.4	50.3	74	120	-				
			Tunnel ventilation shaft	E1	L	N ⁽ⁱ⁾	8.28	5.05	3	3	309.7	55.1	48.4	6.7	54.1	79	92	-				
			Tunnel ventilation shaft	E2	L	Y	8.28	5.05	3	3	309.7	54.8	50.5	4.3	52.8	78	108	0	32			
			Pressurization fan room	E3	L	N ⁽ⁱⁱ⁾	2.30	2.10	2	5	n/a	55	43.8	11.2	55	77	118	-				
			Smoke extract make-up fan room	E4	L	N ⁽ⁱⁱ⁾	1.80	2.40	2	5	n/a	60.8	43.8	17	60.8	83	118	-				
			Tunnel ventilation shaft	S1	L	N ⁽ⁱ⁾	15.15	5.05	3	3	426.9	55.7	50.5	5.2	54.1	80	92	-				
			UPS room	S2	L	N ⁽ⁱⁱ⁾	2.5	1.1	2	5	n/a	59.0	50.0	9	58.4	80	102	-				
			SER	S3	L	Y	0.70	0.70	2	2	n/a	50.3	45.3	5	48.6	63	104	0	18			
			MCC room	S4	L	Y	0.50	0.50	2	1	n/a	55.3	50.2	5.1	53.7	62	108	0	16			
			Smoke extraction fan room	S5	L	N ⁽ⁱⁱ⁾	5.80	1.90	3	1	53.8	64.1	45.3	18.8	64.1	81	105	-				
			ABBCS room	W1	L	Y	1.10	1.00	2	3	n/a	51.1	47.1	4	48.9	66	122	10	9			
			Smoke extraction fan room	W2	L	N ⁽ⁱⁱ⁾	7.00	1.90	3	1	60.9	66.9	47.5	19.4	66.9	85	122	-				
PH4	Sheung Tsuen Village House	Ventilation Shaft for N/B ⁽ⁱ⁾ and Building Service	Tunnel ventilation shaft	N1	L	Y	15.53	5.05	3	3	433.3	53.9	49.5	4.4	51.9	78	86	0	34	36	43	0
			FS control room	N2	L	Y	0.50	0.50	2	1	n/a	55	50.4	4.6	53.2	61	80	0	18			
			P&D pump and tank room	N3	L	Y	2.20	1.70	2	5	n/a	52.9	49.7	3.2	50.1	72	110	0	26			
			Air duct riser	N4	L	Y	5.70	2.50	3	1	59.1	57.7	51.7	6	56.4	74	110	0	28			
			Pressurization fan room	N5	L	N ⁽ⁱⁱ⁾	2.20	2.70	2	6	n/a	51.2	43.8	7.4	50.3	74	80	-				
			Tunnel ventilation shaft	E1	L	N ⁽ⁱ⁾	8.28	5.05	3	3	309.7	55.1	48.4	6.7	54.1	79	114	-				
			Tunnel ventilation shaft	E2	L	Y	8.28	5.05	3	3	309.7	54.8	50.5	4.3	52.8	78	98	10	23			
			Pressurization fan room	E3	L	N ⁽ⁱⁱ⁾	2.30	2.10	2	5	n/a	55	43.8	11.2	55	77	82	-				
			Smoke extract make-up fan room	E4	L	N ⁽ⁱⁱ⁾	1.80	2.40	2	5	n/a	60.8	43.8	17	60.8	83	82	-				
			Tunnel ventilation shaft	S1	L	N ⁽ⁱ⁾	15.15	5.05	3	3	426.9	55.7	50.5	5.2	54.1	80	113	-				
			UPS room	S2	L	N ⁽ⁱⁱ⁾	2.5	1.1	2	5	n/a	59.0	50.0	9	58.4	80	96	-				
			SER	S3	L	Y	0.70	0.70	2	2	n/a	50.3	45.3	5	48.6	63	96	10	8			
			MCC room	S4	L	Y	0.50	0.50	2	1	n/a	55.3	50.2	5.1	53.7	62	108	10	6			
			Smoke extraction fan room	S5	L	N ⁽ⁱⁱ⁾	5.80	1.90	3	1	53.8	64.1	45.3	18.8	64.1	81	96	-				
			ABBCS room	W1	L	Y	1.10	1.00	2	3	n/a	51.1	47.1	4	48.9	66	90	0	22			
			Smoke extraction fan room	W2	L	N ⁽ⁱⁱ⁾	7.00	1.90	3	1	60.9	66.9	47.5	19.4	66.9	85	102	-				
			Tunnel ventilation shaft	N1	L	Y	15.53	5.05	3	3	433.3	53.9	49.5	4.4	51.9	78	99	0	33			
			FS control room	N2	L	Y	0.50	0.50	2	1	n/a	55	50.4	4.6	53.2	61	99	0	16			

NSR		Noise Source	Description	Louvre ID	Plant or Louvre? (P/L)	In operation? (Y/N)	Louvre Size (m)		Method ⁽ⁱⁱ⁾	Measurement Distance, D_M (m)	Surface Area of Measurement Box, S (m ²)	Measured L_{Aeq} [dB(A)] ⁽ⁱⁱⁱ⁾	Average Background L_{Aeq} [dB(A)]	Difference L_{Aeq} [dB(A)]	Background Corrected Measured $L_{Aeq,mea}$ [dB(A)] ^(v)	Calculated SWL L_{Aeq} [dB(A)] ^(v)	Distance from Noise Source to NSR, D_N [m]	Correction for line of sight, LoS [dB(A)]	Corrected SPL at NSR [dB(A)]	Cumulative SPL at NSR [dB(A)]	Night Time Criteria [dB(A)]	Exceedance [dB(A)]
							Width	Height														
PH4a	Sheung Tsuen Village House	Ventilation Shaft for N/B ⁽ⁱ⁾ and Building Service	P&D pump and tank room	N3	L	Y	2.20	1.70	2	5	n/a	52.9	49.7	3.2	50.1	72	120	0	25	35	43	0
			Air duct riser	N4	L	Y	5.70	2.50	3	1	59.1	57.7	51.7	6	56.4	74	120	0	27			
			Pressurization fan room	N5	L	N ⁽ⁱⁱ⁾	2.20	2.70	2	6	n/a	51.2	43.8	7.4	50.3	74	100	-				
			Tunnel ventilation shaft	E1	L	N ⁽ⁱ⁾	8.28	5.05	3	3	309.7	55.1	48.4	6.7	54.1	79	123	-				
			Tunnel ventilation shaft	E2	L	Y	8.28	5.05	3	3	309.7	54.8	50.5	4.3	52.8	78	103	10	23			
			Pressurization fan room	E3	L	N ⁽ⁱⁱ⁾	2.30	2.10	2	5	n/a	55	43.8	11.2	55	77	102	-				
			Smoke extract make-up fan room	E4	L	N ⁽ⁱⁱ⁾	1.80	2.40	2	5	n/a	60.8	43.8	17	60.8	83	103	-				
			Tunnel ventilation shaft	S1	L	N ⁽ⁱ⁾	15.15	5.05	3	3	426.9	55.7	50.5	5.2	54.1	80	131	-				
			UPS room	S2	L	N ⁽ⁱⁱ⁾	2.5	1.1	2	5	n/a	59.0	50.0	9	58.4	80	131	-				
			SER	S3	L	Y	0.70	0.70	2	2	n/a	50.3	45.3	5	48.6	63	131	10	6			
			MCC room	S4	L	Y	0.50	0.50	2	1	n/a	55.3	50.2	5.1	53.7	62	102	10	7			
			Smoke extraction fan room	S5	L	N ⁽ⁱⁱ⁾	5.80	1.90	3	1	53.8	64.1	45.3	18.8	64.1	81	131	-				
			ABBCS room	W1	L	Y	1.10	1.00	2	3	n/a	51.1	47.1	4	48.9	66	101	10	11			
			Smoke extraction fan room	W2	L	N ⁽ⁱⁱ⁾	7.00	1.90	3	1	60.9	66.9	47.5	19.4	66.9	85	125	-				

Remarks:

(i) Tunnel ventilation would only be operated for either northbound (N/B) or southbound (S/B) direction under normal scenario.

(ii) The plant would be operated during day and evening time only under normal scenario.

(iii) Method 2 Far field method for Louvres or Plants

Method 3 Near field method for Louvres or Plants

(iv) Results are averaged from the measured noise levels.

(v) If the difference between the background and the measured noise level is less than 3.0 dB, background noise correction factor should be capped to 3.0 dB.

(vi) The calculation of SWL is in accordance with the methodology described in **Section 3.1.1** and **Appendix A1** of the Report. For Method 3, K2A was not claimed in the calculation.

Night Time Fixed Plant Noise at NSR

NSR		Noise Source	Description	Louvre ID	Plant or Louvre? (P/L)	In operation? (Y/N)	Louvre Size (m)		Method ⁽ⁱⁱ⁾	Measurement Distance, D_M (m)	Surface Area of Measurement Box, S (m ²)	Measured L_{Aeq} [dB(A)] ⁽ⁱⁱⁱ⁾	Average Background L_{Aeq} [dB(A)]	Difference L_{Aeq} [dB(A)]	Background Corrected Measured $L_{Aeq,mea}$ [dB(A)] ^(iv)	Calculated SWL L_{Aeq} [dB(A)] ^(v)	Distance from Noise Source to NSR, D_N [m]	Correction for line of sight, LoS [dB(A)]	Corrected SPL at NSR [dB(A)]	Cumulative SPL at NSR [dB(A)]	Night Time Criteria [dB(A)]	Exceedance [dB(A)]
Width	Height																					
PH1	Sheung Tsuen Village House	Ventilation Shaft for S/B ⁽ⁱ⁾ and Building Service	Tunnel ventilation shaft	N1	L	N ⁽ⁱ⁾	15.53	5.05	3	3	433.3	53.9	49.5	4.4	51.9	78	113	-		38	43	0
			FS control room	N2	L	Y	0.50	0.50	2	1	n/a	55	50.4	4.6	53.2	61	113	10	5			
			P&D pump and tank room	N3	L	Y	2.20	1.70	2	5	n/a	52.9	49.7	3.2	50.1	72	86	10	18			
			Air duct riser	N4	L	Y	5.70	2.50	3	1	59.1	57.7	51.7	6	56.4	74	86	10	20			
			Pressurization fan room	N5	L	N ⁽ⁱⁱ⁾	2.20	2.70	2	6	n/a	51.2	43.8	7.4	50.3	74	113	-				
			Tunnel ventilation shaft	E1	L	Y	8.28	5.05	3	3	309.7	55.1	48.4	6.7	54.1	79	86	10	25			
			Tunnel ventilation shaft	E2	L	N ⁽ⁱ⁾	8.28	5.05	3	3	309.7	54.8	50.5	4.3	52.8	78	106	-				
			Pressurization fan room	E3	L	N ⁽ⁱⁱ⁾	2.30	2.10	2	5	n/a	55	43.8	11.2	55	77	106	-				
			Smoke extract make-up fan room	E4	L	N ⁽ⁱⁱ⁾	1.80	2.40	2	5	n/a	60.8	43.8	17	60.8	83	100	-				
			Tunnel ventilation shaft	S1	L	Y	15.15	5.05	3	3	426.9	55.7	50.5	5.2	54.1	80	81	0	37			
			UPS room	S2	L	N ⁽ⁱⁱ⁾	2.5	1.1	2	5	n/a	59.0	50.0	9	58.4	80	81	-				
			SER	S3	L	Y	0.70	0.70	2	2	n/a	50.3	45.3	5	48.6	63	81	0	20			
			MCC room	S4	L	Y	0.50	0.50	2	1	n/a	55.3	50.2	5.1	53.7	62	100	0	17			
			Smoke extraction fan room	S5	L	N ⁽ⁱⁱ⁾	5.80	1.90	3	1	53.8	64.1	45.3	18.8	64.1	81	81	-				
			ABBCS room	W1	L	Y	1.10	1.00	2	3	n/a	51.1	47.1	4	48.9	66	105	0	21			
			Smoke extraction fan room	W2	L	N ⁽ⁱⁱ⁾	7.00	1.90	3	1	60.9	66.9	47.5	19.4	66.9	85	86	-				
PH1a	Sheung Tsuen Village House	Ventilation Shaft for S/B ⁽ⁱ⁾ and Building Service	Tunnel ventilation shaft	N1	L	N ⁽ⁱ⁾	15.53	5.05	3	3	433.3	53.9	49.5	4.4	51.9	78	95	-		40	43	0
			FS control room	N2	L	Y	0.50	0.50	2	1	n/a	55	50.4	4.6	53.2	61	95	10	6			
			P&D pump and tank room	N3	L	Y	2.20	1.70	2	5	n/a	52.9	49.7	3.2	50.1	72	69	10	20			
			Air duct riser	N4	L	Y	5.70	2.50	3	1	59.1	57.7	51.7	6	56.4	74	69	10	22			
			Pressurization fan room	N5	L	N ⁽ⁱⁱ⁾	2.20	2.70	2	6	n/a	51.2	43.8	7.4	50.3	74	95	-				
			Tunnel ventilation shaft	E1	L	Y	8.28	5.05	3	3	309.7	55.1	48.4	6.7	54.1	79	69	10	27			
			Tunnel ventilation shaft	E2	L	N ⁽ⁱ⁾	8.28	5.05	3	3	309.7	54.8	50.5	4.3	52.8	78	88	-				
			Pressurization fan room	E3	L	N ⁽ⁱⁱ⁾	2.30	2.10	2	5	n/a	55	43.8	11.2	55	77	88	-				
			Smoke extract make-up fan room	E4	L	N ⁽ⁱⁱ⁾	1.80	2.40	2	5	n/a	60.8	43.8	17	60.8	83	82	-				
			Tunnel ventilation shaft	S1	L	Y	15.15	5.05	3	3	426.9	55.7	50.5	5.2	54.1	80	63	0	39			
			UPS room	S2	L	N ⁽ⁱⁱ⁾	2.5	1.1	2	5	n/a	59.0	50.0	9	58.4	80	63	-				
			SER	S3	L	Y	0.70	0.70	2	2	n/a	50.3	45.3	5	48.6	63	63	0	22			
			MCC room	S4	L	Y	0.50	0.50	2	1	n/a	55.3	50.2	5.1	53.7	62	82	0	19			
			Smoke extraction fan room	S5	L	N ⁽ⁱⁱ⁾	5.80	1.90	3	1	53.8	64.1	45.3	18.8	64.1	81	63	-				
			ABBCS room	W1	L	Y	1.10	1.00	2	3	n/a	51.1	47.1	4	48.9	66	86	0	22			
			Smoke extraction fan room	W2	L	N ⁽ⁱⁱ⁾	7.00	1.90	3	1	60.9	66.9	47.5	19.4	66.9	85	74	-				

NSR		Noise Source	Description	Louvre ID	Plant or Louvre? (P/L)	In operation? (Y/N)	Louvre Size (m)		Method ⁽ⁱⁱ⁾	Measurement Distance, D_M (m)	Surface Area of Measurement Box, S (m ²)	Measured L_{Aeq} [dB(A)] ⁽ⁱⁱⁱ⁾	Average Background L_{Aeq} [dB(A)]	Difference L_{Aeq} [dB(A)]	Background Corrected Measured $L_{Aeq,mea}$ [dB(A)] ^(iv)	Calculated SWL L_{Aeq} [dB(A)] ^(v)	Distance from Noise Source to NSR, D_N [m]	Correction for line of sight, LoS [dB(A)]	Corrected SPL at NSR [dB(A)]	Cumulative SPL at NSR [dB(A)]	Night Time Criteria [dB(A)]	Exceedance [dB(A)]
						Width	Height															
PH1b	Sheung Tsuen Village House	Ventilation Shaft for S/B ⁽ⁱ⁾ and Building Service	Tunnel ventilation shaft	N1	L	N ⁽ⁱ⁾	15.53	5.05	3	3	433.3	53.9	49.5	4.4	51.9	78	116	-		39	43	0
			FS control room	N2	L	Y	0.50	0.50	2	1	n/a	55	50.4	4.6	53.2	61	120	10	4			
			P&D pump and tank room	N3	L	Y	2.20	1.70	2	5	n/a	52.9	49.7	3.2	50.1	72	97	10	17			
			Air duct riser	N4	L	Y	5.70	2.50	3	1	59.1	57.7	51.7	6	56.4	74	97	10	19			
			Pressurization fan room	N5	L	N ⁽ⁱⁱ⁾	2.20	2.70	2	6	n/a	51.2	43.8	7.4	50.3	74	120	-				
			Tunnel ventilation shaft	E1	L	Y	8.28	5.05	3	3	309.7	55.1	48.4	6.7	54.1	79	92	0	35			
			Tunnel ventilation shaft	E2	L	N ⁽ⁱ⁾	8.28	5.05	3	3	309.7	54.8	50.5	4.3	52.8	78	108	-				
			Pressurization fan room	E3	L	N ⁽ⁱⁱ⁾	2.30	2.10	2	5	n/a	55	43.8	11.2	55	77	118	-				
			Smoke extract make-up fan room	E4	L	N ⁽ⁱⁱ⁾	1.80	2.40	2	5	n/a	60.8	43.8	17	60.8	83	118	-				
			Tunnel ventilation shaft	S1	L	Y	15.15	5.05	3	3	426.9	55.7	50.5	5.2	54.1	80	92	0	36			
			UPS room	S2	L	N ⁽ⁱⁱ⁾	2.5	1.1	2	5	n/a	59.0	50.0	9	58.4	80	102	-				
			SER	S3	L	Y	0.70	0.70	2	2	n/a	50.3	45.3	5	48.6	63	104	0	18			
			MCC room	S4	L	Y	0.50	0.50	2	1	n/a	55.3	50.2	5.1	53.7	62	108	0	16			
			Smoke extraction fan room	S5	L	N ⁽ⁱⁱ⁾	5.80	1.90	3	1	53.8	64.1	45.3	18.8	64.1	81	105	-				
			ABBCS room	W1	L	Y	1.10	1.00	2	3	n/a	51.1	47.1	4	48.9	66	122	10	9			
			Smoke extraction fan room	W2	L	N ⁽ⁱⁱ⁾	7.00	1.90	3	1	60.9	66.9	47.5	19.4	66.9	85	122	-				
PH4	Sheung Tsuen Village House	Ventilation Shaft for S/B ⁽ⁱ⁾ and Building Service	Tunnel ventilation shaft	N1	L	N ⁽ⁱ⁾	15.53	5.05	3	3	433.3	53.9	49.5	4.4	51.9	78	86	-		32	43	0
			FS control room	N2	L	Y	0.50	0.50	2	1	n/a	55	50.4	4.6	53.2	61	80	0	18			
			P&D pump and tank room	N3	L	Y	2.20	1.70	2	5	n/a	52.9	49.7	3.2	50.1	72	110	0	26			
			Air duct riser	N4	L	Y	5.70	2.50	3	1	59.1	57.7	51.7	6	56.4	74	110	0	28			
			Pressurization fan room	N5	L	N ⁽ⁱⁱ⁾	2.20	2.70	2	6	n/a	51.2	43.8	7.4	50.3	74	80	-				
			Tunnel ventilation shaft	E1	L	Y	8.28	5.05	3	3	309.7	55.1	48.4	6.7	54.1	79	114	10	23			
			Tunnel ventilation shaft	E2	L	N ⁽ⁱ⁾	8.28	5.05	3	3	309.7	54.8	50.5	4.3	52.8	78	98	-				
			Pressurization fan room	E3	L	N ⁽ⁱⁱ⁾	2.30	2.10	2	5	n/a	55	43.8	11.2	55	77	82	-				
			Smoke extract make-up fan room	E4	L	N ⁽ⁱⁱ⁾	1.80	2.40	2	5	n/a	60.8	43.8	17	60.8	83	82	-				
			Tunnel ventilation shaft	S1	L	Y	15.15	5.05	3	3	426.9	55.7	50.5	5.2	54.1	80	113	10	24			
			UPS room	S2	L	N ⁽ⁱⁱ⁾	2.5	1.1	2	5	n/a	59.0	50.0	9	58.4	80	96	-				
			SER	S3	L	Y	0.70	0.70	2	2	n/a	50.3	45.3	5	48.6	63	96	10	8			
			MCC room	S4	L	Y	0.50	0.50	2	1	n/a	55.3	50.2	5.1	53.7	62	108	10	6			
			Smoke extraction fan room	S5	L	N ⁽ⁱⁱ⁾	5.80	1.90	3	1	53.8	64.1	45.3	18.8	64.1	81	96	-				
			ABBCS room	W1	L	Y	1.10	1.00	2	3	n/a	51.1	47.1	4	48.9	66	90	0	22			
			Smoke extraction fan room	W2	L	N ⁽ⁱⁱ⁾	7.00	1.90	3	1	60.9	66.9	47.5	19.4	66.9	85	102	-				
			Tunnel ventilation shaft	N1	L	N ⁽ⁱ⁾	15.53	5.05	3	3	433.3	53.9	49.5	4.4	51.9	78	99	-				
			FS control room	N2	L	Y	0.50	0.50	2	1	n/a	55	50.4	4.6	53.2	61	99	0	16			

NSR		Noise Source	Description	Louvre ID	Plant or Louvre? (P/L)	In operation? (Y/N)	Louvre Size (m)		Method ⁽ⁱⁱ⁾	Measurement Distance, D_M (m)	Surface Area of Measurement Box, S (m ²)	Measured L_{Aeq} [dB(A)] ⁽ⁱⁱⁱ⁾	Average Background L_{Aeq} [dB(A)]	Difference L_{Aeq} [dB(A)]	Background Corrected Measured $L_{Aeq,mea}$ [dB(A)] ^(v)	Calculated SWL L_{Aeq} [dB(A)] ^(v)	Distance from Noise Source to NSR, D_N [m]	Correction for line of sight, LoS [dB(A)]	Corrected SPL at NSR [dB(A)]	Cumulative SPL at NSR [dB(A)]	Night Time Criteria [dB(A)]	Exceedance [dB(A)]
							Width	Height														
PH4a	Sheung Tsuen Village House	Ventilation Shaft for S/B ⁽ⁱ⁾ and Building Service	P&D pump and tank room	N3	L	Y	2.20	1.70	2	5	n/a	52.9	49.7	3.2	50.1	72	120	0	25	31	43	0
			Air duct riser	N4	L	Y	5.70	2.50	3	1	59.1	57.7	51.7	6	56.4	74	120	0	27			
			Pressurization fan room	N5	L	N ⁽ⁱⁱ⁾	2.20	2.70	2	6	n/a	51.2	43.8	7.4	50.3	74	100	-				
			Tunnel ventilation shaft	E1	L	Y	8.28	5.05	3	3	309.7	55.1	48.4	6.7	54.1	79	123	10	22			
			Tunnel ventilation shaft	E2	L	N ⁽ⁱ⁾	8.28	5.05	3	3	309.7	54.8	50.5	4.3	52.8	78	103	-				
			Pressurization fan room	E3	L	N ⁽ⁱⁱ⁾	2.30	2.10	2	5	n/a	55	43.8	11.2	55	77	102	-				
			Smoke extract make-up fan room	E4	L	N ⁽ⁱⁱ⁾	1.80	2.40	2	5	n/a	60.8	43.8	17	60.8	83	103	-				
			Tunnel ventilation shaft	S1	L	Y	15.15	5.05	3	3	426.9	55.7	50.5	5.2	54.1	80	131	10	23			
			UPS room	S2	L	N ⁽ⁱⁱ⁾	2.5	1.1	2	5	n/a	59.0	50.0	9	58.4	80	131	-				
			SER	S3	L	Y	0.70	0.70	2	2	n/a	50.3	45.3	5	48.6	63	131	10	6			
			MCC room	S4	L	Y	0.50	0.50	2	1	n/a	55.3	50.2	5.1	53.7	62	102	10	7			
			Smoke extraction fan room	S5	L	N ⁽ⁱⁱ⁾	5.80	1.90	3	1	53.8	64.1	45.3	18.8	64.1	81	131	-				
			ABBCS room	W1	L	Y	1.10	1.00	2	3	n/a	51.1	47.1	4	48.9	66	101	10	11			
			Smoke extraction fan room	W2	L	N ⁽ⁱⁱ⁾	7.00	1.90	3	1	60.9	66.9	47.5	19.4	66.9	85	125	-				

Remarks:

(i) Tunnel ventilation would only be operated for either northbound (N/B) or southbound (S/B) direction under normal scenario.

(ii) The plant would be operated during day and evening time only under normal scenario.

(iii) Method 2 Far field method for Louvres or Plants

Method 3 Near field method for Louvres or Plants

(iv) Results are averaged from the measured noise levels.

(v) If the difference between the background and the measured noise level is less than 3.0 dB, background noise correction factor should be capped to 3.0 dB.

(vi) The calculation of SWL is in accordance with the methodology described in **Section 3.1.1** and **Appendix A1** of the Report. For Method 3, K2A was not claimed in the calculation.

Day and Evening Time Fixed Plant Noise at NSR

NSR		Noise Source	Description	Louvre ID	Plant or Louvre? (P/L)	In operation? (Y/N)	Louvre Size (m)		Method ⁽ⁱⁱ⁾	Measurement Distance, D_M (m)	Surface Area of Measurement Box, S (m ²)	Measured L_{Aeq} [dB(A)] ⁽ⁱⁱⁱ⁾	Average Background L_{Aeq} [dB(A)]	Difference L_{Aeq} [dB(A)]	Background Corrected Measured $L_{Aeq,mea}$ [dB(A)] ^(iv)	Calculated SWL L_{Aeq} [dB(A)] ^(v)	Distance from Noise Source to NSR, D_N [m]	Correction for line of sight, LoS [dB(A)]	Corrected SPL at NSR [dB(A)]	Cumulative SPL at NSR [dB(A)]	Day and Evening Time Criteria [dB(A)]	Exceedance [dB(A)]
							Width	Height														
NC10	St. Margaret's Coeducational English Secondary & Primary School	Ventilation Shaft for N/B ⁽ⁱ⁾ and Building Service	Tunnel ventilation shaft	N1	L	Y	18.30	5.65	3	3	498.8	57.2	54	3.2	54.4	81	141	-		36	60	0
			FS Control Room	N2	L	Y	2.44	0.55	3	1	25.3	54.8	49.6	5.2	53.2	67	141	0	19			
			E&M Service Area 8	N3	L	Y	3.16	5.61	3	1	64.8	61.2	55.8	5.4	59.7	78	141	0	30			
			Tunnel ventilation shaft	E1	L	Y	17.45	6.18	3	1	214.4	60.7	55.9	4.8	59	82	137	0	34			
			E&M Service Area 10	S1	L	Y	1.56	1.86	3	1	28.6	59.5	55.8	3.7	57.1	72	151	10	13			
			E&M Service Area 10	S2	L	Y	7.86	1.86	3	1	65.5	57.2	56.9	0.3	54.2	72	151	10	13			
			E&M Service Area 9	S3	L	Y	5.90	1.40	3	1	49.5	55.3	55.1	0.2	52.3	69	151	10	10			
			Dog house	S4	L	Y	0.8	0.8	2	2	N/A	67.8	56.5	11.3	67.8	82	170	10	22			
			LV Switch Room	W1	L	Y	0.80	0.80	3	1	19.0	61.7	54	7.7	60.9	74	164	10	15			
NC11	Tack Ching Girls' Secondary School	Ventilation Shaft for N/B ⁽ⁱ⁾ and Building Service	Tunnel ventilation shaft	N1	L	Y	18.30	5.65	3	3	498.8	57.2	54	3.2	54.4	81	141	-		37	60	0
			FS Control Room	N2	L	Y	2.44	0.55	3	1	25.3	54.8	49.6	5.2	53.2	67	136	0	19			
			E&M Service Area 8	N3	L	Y	3.16	5.61	3	1	64.8	61.2	55.8	5.4	59.7	78	136	0	30			
			Tunnel ventilation shaft	E1	L	Y	17.45	6.18	3	1	214.4	60.7	55.9	4.8	59	82	163	10	23			
			E&M Service Area 10	S1	L	Y	1.56	1.86	3	1	28.6	59.5	55.8	3.7	57.1	72	135	10	14			
			E&M Service Area 10	S2	L	Y	7.86	1.86	3	1	65.5	57.2	56.9	0.3	54.2	72	135	10	14			
			E&M Service Area 9	S3	L	Y	5.90	1.40	3	1	49.5	55.3	55.1	0.2	52.3	69	135	10	11			
			Dog house	S4	L	Y	0.8	0.8	2	2	N/A	67.8	56.5	11.3	67.8	82	133	0	35			
			LV Switch Room	W1	L	Y	0.80	0.80	3	1	19.0	61.7	54	7.7	60.9	74	128	0	27			
NC11e	Planned development (site 6), Block 1 ^(vi)	Ventilation Shaft for N/B ⁽ⁱ⁾ and Building Service	Tunnel ventilation shaft	N1	L	Y	18.30	5.65	3	3	498.8	57.2	54	3.2	54.4	81	30	-		46	60	0
			FS Control Room	N2	L	Y	2.44	0.55	3	1	25.3	54.8	49.6	5.2	53.2	67	30	10	22			
			E&M Service Area 8	N3	L	Y	3.16	5.61	3	1	64.8	61.2	55.8	5.4	59.7	78	30	10	33			
			Tunnel ventilation shaft	E1	L	Y	17.45	6.18	3	1	214.4	60.7	55.9	4.8	59	82	32	10	37			
			E&M Service Area 10	S1	L	Y	1.56	1.86	3	1	28.6	59.5	55.8	3.7	57.1	72	20	10	31			
			E&M Service Area 10	S2	L	Y	7.86	1.86	3	1	65.5	57.2	56.9	0.3	54.2	72	13	10	35			
			E&M Service Area 9	S3	L	Y	5.90	1.40	3	1	49.5	55.3	55.1	0.2	52.3	69	9	10	35			
			Dog house	S4	L	Y	0.8	0.8	2	2	N/A	67.8	56.5	11.3	67.8	82	16	10	43			
			LV Switch Room	W1	L	Y	0.80	0.80	3	1	19.0	61.7	54	7.7	60.9	74	11	10	38			
NC11f	Planned development (site 6), Block 1 ^(vi)	Ventilation Shaft for N/B ⁽ⁱ⁾ and Building Service	Tunnel ventilation shaft	N1	L	Y	18.30	5.65	3	3	498.8	57.2	54	3.2	54.4	81	29	-		46	60	0
			FS Control Room	N2	L	Y	2.44	0.55	3	1	25.3	54.8	49.6	5.2	53.2	67	29	10	23			
			E&M Service Area 8	N3	L	Y	3.16	5.61	3	1	64.8	61.2	55.8	5.4	59.7	78	29	10	34			
			Tunnel ventilation shaft	E1	L	Y	17.45	6.18	3	1	214.4	60.7	55.9	4.8	59	82	21	10	41			
			E&M Service Area 10	S1	L	Y	1.56	1.86	3	1	28.6	59.5	55.8	3.7	57.1	72	13	10	35			
			E&M Service Area 10	S2	L	Y	7.86	1.86	3	1	65.5	57.2	56.9	0.3	54.2	72	8	10	39			
			E&M Service Area 9	S3	L	Y	5.90	1.40	3	1	49.5	55.3	55.1	0.2	52.3	69	11	10	33			
			Dog house	S4	L	Y	0.8	0.8	2	2	N/A	67.8	56.5	11.3	67.8	82	25	10	39			

NSR		Noise Source	Description	Louvre ID	Plant or Louvre? (P/L)	In operation? (Y/N)	Louvre Size (m)		Method (ii)	Measurement Distance, D_M (m)	Surface Area of Measurement Box, S (m ²)	Measured L_{Aeq} [dB(A)] (iii)	Average Background L_{Aeq} [dB(A)]	Difference L_{Aeq} [dB(A)]	Background Corrected Measured $L_{Aeq,mea}$ [dB(A)] (iv)	Calculated SWL L_{Aeq} [dB(A)] (v)	Distance from Noise Source to NSR, D_N [m]	Correction for line of sight, LoS [dB(A)]	Corrected SPL at NSR [dB(A)]	Cumulative SPL at NSR [dB(A)]	Day and Evening Time Criteria [dB(A)]	Exceedance [dB(A)]
							Width	Height														
			LV Switch Room	W1	L	Y	0.80	0.80	3	1	19.0	61.7	54	7.7	60.9	74	20	10	33			
NC11g	Planned development (site 6), Block 2	Ventilation Shaft for N/B (i) and Building Service	Tunnel ventilation shaft	N1	L	Y	18.30	5.65	3	3	498.8	57.2	54	3.2	54.4	81	50	-		48	60	0
			FS Control Room	N2	L	Y	2.44	0.55	3	1	25.3	54.8	49.6	5.2	53.2	67	50	10	18			
			E&M Service Area 8	N3	L	Y	3.16	5.61	3	1	64.8	61.2	55.8	5.4	59.7	78	50	10	29			
			Tunnel ventilation shaft	E1	L	Y	17.45	6.18	3	1	214.4	60.7	55.9	4.8	59	82	33	0	47			
			E&M Service Area 10	S1	L	Y	1.56	1.86	3	1	28.6	59.5	55.8	3.7	57.1	72	45	0	34			
			E&M Service Area 10	S2	L	Y	7.86	1.86	3	1	65.5	57.2	56.9	0.3	54.2	72	55	0	32			
			E&M Service Area 9	S3	L	Y	5.90	1.40	3	1	49.5	55.3	55.1	0.2	52.3	69	62	0	28			
			Dog house	S4	L	Y	0.8	0.8	2	2	N/A	67.8	56.5	11.3	67.8	82	66	10	31			
			LV Switch Room	W1	L	Y	0.80	0.80	3	1	19.0	61.7	54	7.7	60.9	74	71	10	22			
NC11h	Planned development (site 6), Block 2	Ventilation Shaft for N/B (i) and Building Service	Tunnel ventilation shaft	N1	L	Y	18.30	5.65	3	3	498.8	57.2	54	3.2	54.4	81	50	-		47	60	0
			FS Control Room	N2	L	Y	2.44	0.55	3	1	25.3	54.8	49.6	5.2	53.2	67	55	10	17			
			E&M Service Area 8	N3	L	Y	3.16	5.61	3	1	64.8	61.2	55.8	5.4	59.7	78	55	10	28			
			Tunnel ventilation shaft	E1	L	Y	17.45	6.18	3	1	214.4	60.7	55.9	4.8	59	82	34	0	46			
			E&M Service Area 10	S1	L	Y	1.56	1.86	3	1	28.6	59.5	55.8	3.7	57.1	72	47	0	34			
			E&M Service Area 10	S2	L	Y	7.86	1.86	3	1	65.5	57.2	56.9	0.3	54.2	72	55	0	32			
			E&M Service Area 9	S3	L	Y	5.90	1.40	3	1	49.5	55.3	55.1	0.2	52.3	69	62	0	28			
			Dog house	S4	L	Y	0.8	0.8	2	2	N/A	67.8	56.5	11.3	67.8	82	77	10	29			
			LV Switch Room	W1	L	Y	0.80	0.80	3	1	19.0	61.7	54	7.7	60.9	74	72	10	22			
NC16	Tower 3 Aqua Marine	Ventilation Shaft for N/B (i) and Building Service	Tunnel ventilation shaft	N1	L	Y	18.30	5.65	3	3	498.8	57.2	54	3.2	54.4	81	239	-		32	65	0
			FS Control Room	N2	L	Y	2.44	0.55	3	1	25.3	54.8	49.6	5.2	53.2	67	239	0	14			
			E&M Service Area 8	N3	L	Y	3.16	5.61	3	1	64.8	61.2	55.8	5.4	59.7	78	239	0	25			
			Tunnel ventilation shaft	E1	L	Y	17.45	6.18	3	1	214.4	60.7	55.9	4.8	59	82	261	10	19			
			E&M Service Area 10	S1	L	Y	1.56	1.86	3	1	28.6	59.5	55.8	3.7	57.1	72	230	10	10			
			E&M Service Area 10	S2	L	Y	7.86	1.86	3	1	65.5	57.2	56.9	0.3	54.2	72	230	10	10			
			E&M Service Area 9	S3	L	Y	5.90	1.40	3	1	49.5	55.3	55.1	0.2	52.3	69	230	10	7			
			Dog house	S4	L	Y	0.8	0.8	2	2	N/A	67.8	56.5	11.3	67.8	82	225	0	30			
			LV Switch Room	W1	L	Y	0.80	0.80	3	1	19.0	61.7	54	7.7	60.9	74	225	0	22			

Remarks:

(i) Tunnel ventilation would only be operated for either northbound (N/B) or southbound (S/B) direction under normal scenario.

(ii) Method 2 Far field method for Louvres or Plants

Method 3 Near field method for Louvres or Plants

(iii) Results are averaged from the measured noise levels.

(iv) If the difference between the background and the measured noise level is less than 3.0 dB, background noise correction factor should be capped to 3.0 dB.

(v) The calculation of SWL is in accordance with the methodology described in **Section 3.1.1** and **Appendix A1** of the Report. For Method 3, K2A was not claimed in the calculation.

(vi) A canopy with acoustic lining will be provided at the southern façade of NCV for screening the fixed plant noise from the southern louvres to Block 1.

NSR		Noise Source	Description	Louvre ID	Plant or Louvre? (P/L)	In operation? (Y/N)	Louvre Size (m)		Method ⁽ⁱⁱ⁾	Measure- ment Distance, D_M (m)	Surface Area of Measurement Box, S (m ²)	Measured L_{Aeq} [dB(A)] ⁽ⁱⁱⁱ⁾	Average Background L_{Aeq} [dB(A)]	Difference L_{Aeq} [dB(A)]	Background Corrected Measured $L_{Aeq,mea}$ [dB(A)] ^(iv)	Calculated SWL L_{Aeq} [dB(A)] ^(v)	Distance from Noise Source to NSR, D_N [m]	Correction for line of sight, LoS [dB(A)]	Corrected SPL at NSR [dB(A)]	Cumulative SPL at NSR [dB(A)]	Day and Evening Time Criteria [dB(A)]	Exceedance [dB(A)]
							Width	Height														
NC10	St. Margaret's Coeducational English Secondary & Primary School	Ventilation Shaft for S/B ⁽ⁱ⁾ and Building Service	Tunnel ventilation shaft	N1	L	Y	18.30	5.65	3	3	498.8	57.2	54	3.2	54.4	81	141	0	33	35	60	0
			FS Control Room	N2	L	Y	2.44	0.55	3	1	25.3	54.8	49.6	5.2	53.2	67	141	0	19			
			E&M Service Area 8	N3	L	Y	3.16	5.61	3	1	64.8	61.2	55.8	5.4	59.7	78	141	0	30			
			Tunnel ventilation shaft	E1	L	Y	17.45	6.18	3	1	214.4	60.7	55.9	4.8	59	82	137	-				
			E&M Service Area 10	S1	L	Y	1.56	1.86	3	1	28.6	59.5	55.8	3.7	57.1	72	151	10	13			
			E&M Service Area 10	S2	L	Y	7.86	1.86	3	1	65.5	57.2	56.9	0.3	54.2	72	151	10	13			
			E&M Service Area 9	S3	L	Y	5.90	1.40	3	1	49.5	55.3	55.1	0.2	52.3	69	151	10	10			
			Dog house	S4	L	Y	0.8	0.8	2	2	N/A	67.8	56.5	11.3	67.8	82	170	10	22			
			LV Switch Room	W1	L	Y	0.80	0.80	3	1	19.0	61.7	54	7.7	60.9	74	164	10	15			
NC11	Tack Ching Girls' Secondary School	Ventilation Shaft for S/B ⁽ⁱ⁾ and Building Service	Tunnel ventilation shaft	N1	L	Y	18.30	5.65	3	3	498.8	57.2	54	3.2	54.4	81	141	0	33	38	60	0
			FS Control Room	N2	L	Y	2.44	0.55	3	1	25.3	54.8	49.6	5.2	53.2	67	136	0	19			
			E&M Service Area 8	N3	L	Y	3.16	5.61	3	1	64.8	61.2	55.8	5.4	59.7	78	136	0	30			
			Tunnel ventilation shaft	E1	L	Y	17.45	6.18	3	1	214.4	60.7	55.9	4.8	59	82	163	-				
			E&M Service Area 10	S1	L	Y	1.56	1.86	3	1	28.6	59.5	55.8	3.7	57.1	72	135	10	14			
			E&M Service Area 10	S2	L	Y	7.86	1.86	3	1	65.5	57.2	56.9	0.3	54.2	72	135	10	14			
			E&M Service Area 9	S3	L	Y	5.90	1.40	3	1	49.5	55.3	55.1	0.2	52.3	69	135	10	11			
			Dog house	S4	L	Y	0.8	0.8	2	2	N/A	67.8	56.5	11.3	67.8	82	133	0	35			
			LV Switch Room	W1	L	Y	0.80	0.80	3	1	19.0	61.7	54	7.7	60.9	74	128	0	27			
NC11e	Planned development (site 6), Block 1 ^(vi)	Ventilation Shaft for S/B ⁽ⁱ⁾ and Building Service	Tunnel ventilation shaft	N1	L	Y	18.30	5.65	3	3	498.8	57.2	54	3.2	54.4	81	30	10	36	46	60	0
			FS Control Room	N2	L	Y	2.44	0.55	3	1	25.3	54.8	49.6	5.2	53.2	67	30	10	22			
			E&M Service Area 8	N3	L	Y	3.16	5.61	3	1	64.8	61.2	55.8	5.4	59.7	78	30	10	33			
			Tunnel ventilation shaft	E1	L	Y	17.45	6.18	3	1	214.4	60.7	55.9	4.8	59	82	32					
			E&M Service Area 10	S1	L	Y	1.56	1.86	3	1	28.6	59.5	55.8	3.7	57.1	72	20	10	31			
			E&M Service Area 10	S2	L	Y	7.86	1.86	3	1	65.5	57.2	56.9	0.3	54.2	72	13	10	35			
			E&M Service Area 9	S3	L	Y	5.90	1.40	3	1	49.5	55.3	55.1	0.2	52.3	69	9	10	35			
			Dog house	S4	L	Y	0.8	0.8	2	2	N/A	67.8	56.5	11.3	67.8	82	16	10	43			
			LV Switch Room	W1	L	Y	0.80	0.80	3	1	19.0	61.7	54	7.7	60.9	74	11	10	38			
NC11f	Planned development (site 6), Block 1 ^(vi)	Ventilation Shaft for S/B ⁽ⁱ⁾ and Building Service	Tunnel ventilation shaft	N1	L	Y	18.30	5.65	3	3	498.8	57.2	54	3.2	54.4	81	29	10	37	45	60	0
			FS Control Room	N2	L	Y	2.44	0.55	3	1	25.3	54.8	49.6	5.2	53.2	67	29	10	23			
			E&M Service Area 8	N3	L	Y	3.16	5.61	3	1	64.8	61.2	55.8	5.4	59.7	78	29	10	34			
			Tunnel ventilation shaft	E1	L	Y	17.45	6.18	3	1	214.4	60.7	55.9	4.8	59	82	21	-				
			E&M Service Area 10	S1	L	Y	1.56	1.86	3	1	28.6	59.5	55.8	3.7	57.1	72	13	10	35			
			E&M Service Area 10	S2	L	Y	7.86	1.86	3	1	65.5	57.2	56.9	0.3	54.2	72	8	10	39			
			E&M Service Area 9	S3	L	Y	5.90	1.40	3	1	49.5	55.3	55.1	0.2	52.3	69	11	10	33			
			Dog house	S4	L	Y	0.8	0.8	2	2	N/A	67.8	56.5	11.3	67.8	82	25	10	39			

NSR		Noise Source	Description	Louvre ID	Plant or Louvre? (P/L)	In operation? (Y/N)	Louvre Size (m)		Method (ii)	Measurement Distance, D_M (m)	Surface Area of Measurement Box, S (m ²)	Measured L_{Aeq} [dB(A)] (iii)	Average Background L_{Aeq} [dB(A)]	Difference L_{Aeq} [dB(A)]	Background Corrected Measured $L_{Aeq,mea}$ [dB(A)] (iv)	Calculated SWL L_{Aeq} [dB(A)] (v)	Distance from Noise Source to NSR, D_N [m]	Correction for line of sight, LoS [dB(A)]	Corrected SPL at NSR [dB(A)]	Cumulative SPL at NSR [dB(A)]	Day and Evening Time Criteria [dB(A)]	Exceedance [dB(A)]
							Width	Height														
			LV Switch Room	W1	L	Y	0.80	0.80	3	1	19.0	61.7	54	7.7	60.9	74	20	10	33			
NC11g	Planned development (site 6), Block 2	Ventilation Shaft for S/B (i) and Building Service	Tunnel ventilation shaft	N1	L	Y	18.30	5.65	3	3	498.8	57.2	54	3.2	54.4	81	50	10	32	39	60	0
			FS Control Room	N2	L	Y	2.44	0.55	3	1	25.3	54.8	49.6	5.2	53.2	67	50	10	18			
			E&M Service Area 8	N3	L	Y	3.16	5.61	3	1	64.8	61.2	55.8	5.4	59.7	78	50	10	29			
			Tunnel ventilation shaft	E1	L	Y	17.45	6.18	3	1	214.4	60.7	55.9	4.8	59	82	33	-				
			E&M Service Area 10	S1	L	Y	1.56	1.86	3	1	28.6	59.5	55.8	3.7	57.1	72	45	0	34			
			E&M Service Area 10	S2	L	Y	7.86	1.86	3	1	65.5	57.2	56.9	0.3	54.2	72	55	0	32			
			E&M Service Area 9	S3	L	Y	5.90	1.40	3	1	49.5	55.3	55.1	0.2	52.3	69	62	0	28			
			Dog house	S4	L	Y	0.8	0.8	2	2	N/A	67.8	56.5	11.3	67.8	82	66	10	31			
			LV Switch Room	W1	L	Y	0.80	0.80	3	1	19.0	61.7	54	7.7	60.9	74	71	10	22			
NC11h	Planned development (site 6), Block 2	Ventilation Shaft for S/B (i) and Building Service	Tunnel ventilation shaft	N1	L	Y	18.30	5.65	3	3	498.8	57.2	54	3.2	54.4	81	50	10	32	39	60	0
			FS Control Room	N2	L	Y	2.44	0.55	3	1	25.3	54.8	49.6	5.2	53.2	67	55	10	17			
			E&M Service Area 8	N3	L	Y	3.16	5.61	3	1	64.8	61.2	55.8	5.4	59.7	78	55	10	28			
			Tunnel ventilation shaft	E1	L	Y	17.45	6.18	3	1	214.4	60.7	55.9	4.8	59	82	34	-				
			E&M Service Area 10	S1	L	Y	1.56	1.86	3	1	28.6	59.5	55.8	3.7	57.1	72	47	0	34			
			E&M Service Area 10	S2	L	Y	7.86	1.86	3	1	65.5	57.2	56.9	0.3	54.2	72	55	0	32			
			E&M Service Area 9	S3	L	Y	5.90	1.40	3	1	49.5	55.3	55.1	0.2	52.3	69	62	0	28			
			Dog house	S4	L	Y	0.8	0.8	2	2	N/A	67.8	56.5	11.3	67.8	82	77	10	29			
			LV Switch Room	W1	L	Y	0.80	0.80	3	1	19.0	61.7	54	7.7	60.9	74	72	10	22			
NC16	Tower 3 Aqua Marine	Ventilation Shaft for S/B (i) and Building Service	Tunnel ventilation shaft	N1	L	Y	18.30	5.65	3	3	498.8	57.2	54	3.2	54.4	81	239	0	28	33	65	0
			FS Control Room	N2	L	Y	2.44	0.55	3	1	25.3	54.8	49.6	5.2	53.2	67	239	0	14			
			E&M Service Area 8	N3	L	Y	3.16	5.61	3	1	64.8	61.2	55.8	5.4	59.7	78	239	0	25			
			Tunnel ventilation shaft	E1	L	Y	17.45	6.18	3	1	214.4	60.7	55.9	4.8	59	82	261	-				
			E&M Service Area 10	S1	L	Y	1.56	1.86	3	1	28.6	59.5	55.8	3.7	57.1	72	230	10	10			
			E&M Service Area 10	S2	L	Y	7.86	1.86	3	1	65.5	57.2	56.9	0.3	54.2	72	230	10	10			
			E&M Service Area 9	S3	L	Y	5.90	1.40	3	1	49.5	55.3	55.1	0.2	52.3	69	230	10	7			
			Dog house	S4	L	Y	0.8	0.8	2	2	N/A	67.8	56.5	11.3	67.8	82	225	0	30			
			LV Switch Room	W1	L	Y	0.80	0.80	3	1	19.0	61.7	54	7.7	60.9	74	225	0	22			

Remarks:

(i) Tunnel ventilation would only be operated for either northbound (N/B) or southbound (S/B) direction under normal scenario.

(ii) Method 2 Far field method for Louvres or Plants

Method 3 Near field method for Louvres or Plants

(iii) Results are averaged from the measured noise levels.

(iv) If the difference between the background and the measured noise level is less than 3.0 dB, background noise correction factor should be capped to 3.0 dB.

(v) The calculation of SWL is in accordance with the methodology described in **Section 3.1.1** and **Appendix A1** of the Report. For Method 3, K2A was not claimed in the calculation.

(vi) A canopy with acoustic lining will be provided at the southern façade of NCV for screening the fixed plant noise from the southern louvres to Block 1.

Night Time Fixed Plant Noise at NSR

NSR		Noise Source	Description	Louvre ID	Plant or Louvre? (P/L)	In operation? (Y/N)	Louvre Size (m)		Method ⁽ⁱⁱ⁾	Measure-ment Distance, D_M (m)	Surface Area of Measurement Box, S (m ²)	Measured L_{Aeq} [dB(A)] ⁽ⁱⁱⁱ⁾	Average Background L_{Aeq} [dB(A)]	Difference L_{Aeq} [dB(A)]	Background Corrected Measured $L_{Aeq,mea}$ [dB(A)] ^(iv)	Calculated SWL L_{Aeq} [dB(A)] ^(v)	Distance from Noise Source to NSR, D_N [m]	Correction for line of sight, LoS [dB(A)]	Corrected SPL at NSR [dB(A)]	Cumulative SPL at NSR [dB(A)]	Night Time Criteria [dB(A)]	Exceedance [dB(A)]
							Width	Height														
NC10	St. Margaret's Coeducational English Secondary & Primary School	Ventilation Shaft for N/B ⁽ⁱ⁾ and Building Service	Tunnel ventilation shaft	N1	L	Y	18.30	5.65	3	3	498.8	57.2	54	3.2	54.4	81	141	-		36	50	0
			FS Control Room	N2	L	Y	2.44	0.55	3	1	25.3	54.8	49.6	5.2	53.2	67	141	0	19			
			E&M Service Area 8	N3	L	Y	3.16	5.61	3	1	64.8	61.2	55.8	5.4	59.7	78	141	0	30			
			Tunnel ventilation shaft	E1	L	Y	17.45	6.18	3	1	214.4	60.7	55.9	4.8	59	82	137	0	34			
			E&M Service Area 10	S1	L	Y	1.56	1.86	3	1	28.6	59.5	55.8	3.7	57.1	72	151	10	13			
			E&M Service Area 10	S2	L	Y	7.86	1.86	3	1	65.5	57.2	56.9	0.3	54.2	72	151	10	13			
			E&M Service Area 9	S3	L	N ⁽ⁱⁱⁱ⁾	5.90	1.40	3	1	49.5	55.3	55.1	0.2	52.3	69	151	-				
			Dog house	S4	L	N ⁽ⁱⁱⁱ⁾	0.8	0.8	2	2	N/A	67.8	56.5	11.3	67.8	82	170	-				
			LV Switch Room	W1	L	Y	0.80	0.80	3	1	19.0	61.7	54	7.7	60.9	74	164	10	15			
NC11	Tack Ching Girls' Secondary School	Ventilation Shaft for N/B ⁽ⁱ⁾ and Building Service	Tunnel ventilation shaft	N1	L	Y	18.30	5.65	3	3	498.8	57.2	54	3.2	54.4	81	141	-		33	50	0
			FS Control Room	N2	L	Y	2.44	0.55	3	1	25.3	54.8	49.6	5.2	53.2	67	136	0	19			
			E&M Service Area 8	N3	L	Y	3.16	5.61	3	1	64.8	61.2	55.8	5.4	59.7	78	136	0	30			
			Tunnel ventilation shaft	E1	L	Y	17.45	6.18	3	1	214.4	60.7	55.9	4.8	59	82	163	10	23			
			E&M Service Area 10	S1	L	Y	1.56	1.86	3	1	28.6	59.5	55.8	3.7	57.1	72	135	10	14			
			E&M Service Area 10	S2	L	Y	7.86	1.86	3	1	65.5	57.2	56.9	0.3	54.2	72	135	10	14			
			E&M Service Area 9	S3	L	N ⁽ⁱⁱⁱ⁾	5.90	1.40	3	1	49.5	55.3	55.1	0.2	52.3	69	135	-				
			Dog house	S4	L	N ⁽ⁱⁱⁱ⁾	0.8	0.8	2	2	N/A	67.8	56.5	11.3	67.8	82	133	-				
			LV Switch Room	W1	L	Y	0.80	0.80	3	1	19.0	61.7	54	7.7	60.9	74	128	0	27			
NC11e	Planned development (site 6), Block 1 ^(vi)	Ventilation Shaft for N/B ⁽ⁱ⁾ and Building Service	Tunnel ventilation shaft	N1	L	Y	18.30	5.65	3	3	498.8	57.2	54	3.2	54.4	81	30	-		43	50	0
			FS Control Room	N2	L	Y	2.44	0.55	3	1	25.3	54.8	49.6	5.2	53.2	67	30	10	22			
			E&M Service Area 8	N3	L	Y	3.16	5.61	3	1	64.8	61.2	55.8	5.4	59.7	78	30	10	33			
			Tunnel ventilation shaft	E1	L	Y	17.45	6.18	3	1	214.4	60.7	55.9	4.8	59	82	32	10	37			
			E&M Service Area 10	S1	L	Y	1.56	1.86	3	1	28.6	59.5	55.8	3.7	57.1	72	20	10	31			
			E&M Service Area 10	S2	L	Y	7.86	1.86	3	1	65.5	57.2	56.9	0.3	54.2	72	13	10	35			
			E&M Service Area 9	S3	L	N ⁽ⁱⁱⁱ⁾	5.90	1.40	3	1	49.5	55.3	55.1	0.2	52.3	69	9	-				
			Dog house	S4	L	N ⁽ⁱⁱⁱ⁾	0.8	0.8	2	2	N/A	67.8	56.5	11.3	67.8	82	16	-				
			LV Switch Room	W1	L	Y	0.80	0.80	3	1	19.0	61.7	54	7.7	60.9	74	11	10	38			
NC11f	Planned development (site 6), Block 1 ^(vi)	Ventilation Shaft for N/B ⁽ⁱ⁾ and Building Service	Tunnel ventilation shaft	N1	L	Y	18.30	5.65	3	3	498.8	57.2	54	3.2	54.4	81	29	-		45	50	0
			FS Control Room	N2	L	Y	2.44	0.55	3	1	25.3	54.8	49.6	5.2	53.2	67	29	10	23			
			E&M Service Area 8	N3	L	Y	3.16	5.61	3	1	64.8	61.2	55.8	5.4	59.7	78	29	10	34			
			Tunnel ventilation shaft	E1	L	Y	17.45	6.18	3	1	214.4	60.7	55.9	4.8	59	82	21	10	41			
			E&M Service Area 10	S1	L	Y	1.56	1.86	3	1	28.6	59.5	55.8	3.7	57.1	72	13	10	35			
			E&M Service Area 10	S2	L	Y	7.86	1.86	3	1	65.5	57.2	56.9	0.3	54.2	72	8	10	39			
			E&M Service Area 9	S3	L	N ⁽ⁱⁱⁱ⁾	5.90	1.40	3	1	49.5	55.3	55.1	0.2	52.3	69	11	-				
			Dog house	S4	L	N ⁽ⁱⁱⁱ⁾	0.8	0.8	2	2	N/A	67.8	56.5	11.3	67.8	82	25	-				

NSR		Noise Source	Description	Louvre ID	Plant or Louvre? (P/L)	In operation? (Y/N)	Louvre Size (m)		Method ⁽ⁱⁱ⁾	Measure-ment Distance, D_M (m)	Surface Area of Measurement Box, S (m ²)	Measured L_{Aeq} [dB(A)] ⁽ⁱⁱⁱ⁾	Average Background L_{Aeq} [dB(A)]	Difference L_{Aeq} [dB(A)]	Background Corrected Measured $L_{Aeq,mea}$ [dB(A)] ^(iv)	Calculated SWL L_{Aeq} [dB(A)] ^(v)	Distance from Noise Source to NSR, D_N [m]	Correction for line of sight, LoS [dB(A)]	Corrected SPL at NSR [dB(A)]	Cumulative SPL at NSR [dB(A)]	Night Time Criteria [dB(A)]	Exceedance [dB(A)]
							Width	Height														
			LV Switch Room	W1	L	Y	0.80	0.80	3	1	19.0	61.7	54	7.7	60.9	74	20	10	33			
NC11g	Planned development (site 6), Block 2	Ventilation Shaft for N/B ⁽ⁱ⁾ and Building Service	Tunnel ventilation shaft	N1	L	Y	18.30	5.65	3	3	498.8	57.2	54	3.2	54.4	81	50	-		47	50	0
			FS Control Room	N2	L	Y	2.44	0.55	3	1	25.3	54.8	49.6	5.2	53.2	67	50	10	18			
			E&M Service Area 8	N3	L	Y	3.16	5.61	3	1	64.8	61.2	55.8	5.4	59.7	78	50	10	29			
			Tunnel ventilation shaft	E1	L	Y	17.45	6.18	3	1	214.4	60.7	55.9	4.8	59	82	33	0	47			
			E&M Service Area 10	S1	L	Y	1.56	1.86	3	1	28.6	59.5	55.8	3.7	57.1	72	45	0	34			
			E&M Service Area 10	S2	L	Y	7.86	1.86	3	1	65.5	57.2	56.9	0.3	54.2	72	55	0	32			
			E&M Service Area 9	S3	L	N ⁽ⁱⁱ⁾	5.90	1.40	3	1	49.5	55.3	55.1	0.2	52.3	69	62	-				
			Dog house	S4	L	N ⁽ⁱⁱ⁾	0.8	0.8	2	2	N/A	67.8	56.5	11.3	67.8	82	66	-				
			LV Switch Room	W1	L	Y	0.80	0.80	3	1	19.0	61.7	54	7.7	60.9	74	71	10	22			
NC11h	Planned development (site 6), Block 2	Ventilation Shaft for N/B ⁽ⁱ⁾ and Building Service	Tunnel ventilation shaft	N1	L	Y	18.30	5.65	3	3	498.8	57.2	54	3.2	54.4	81	50	-		47	50	0
			FS Control Room	N2	L	Y	2.44	0.55	3	1	25.3	54.8	49.6	5.2	53.2	67	55	10	17			
			E&M Service Area 8	N3	L	Y	3.16	5.61	3	1	64.8	61.2	55.8	5.4	59.7	78	55	10	28			
			Tunnel ventilation shaft	E1	L	Y	17.45	6.18	3	1	214.4	60.7	55.9	4.8	59	82	34	0	46			
			E&M Service Area 10	S1	L	Y	1.56	1.86	3	1	28.6	59.5	55.8	3.7	57.1	72	47	0	34			
			E&M Service Area 10	S2	L	Y	7.86	1.86	3	1	65.5	57.2	56.9	0.3	54.2	72	55	0	32			
			E&M Service Area 9	S3	L	N ⁽ⁱⁱ⁾	5.90	1.40	3	1	49.5	55.3	55.1	0.2	52.3	69	62	-				
			Dog house	S4	L	N ⁽ⁱⁱ⁾	0.8	0.8	2	2	N/A	67.8	56.5	11.3	67.8	82	77	-				
			LV Switch Room	W1	L	Y	0.80	0.80	3	1	19.0	61.7	54	7.7	60.9	74	72	10	22			
NC16	Tower 3 Aqua Marine	Ventilation Shaft for N/B ⁽ⁱ⁾ and Building Service	Tunnel ventilation shaft	N1	L	Y	18.30	5.65	3	3	498.8	57.2	54	3.2	54.4	81	239	-		28	55	0
			FS Control Room	N2	L	Y	2.44	0.55	3	1	25.3	54.8	49.6	5.2	53.2	67	239	0	14			
			E&M Service Area 8	N3	L	Y	3.16	5.61	3	1	64.8	61.2	55.8	5.4	59.7	78	239	0	25			
			Tunnel ventilation shaft	E1	L	Y	17.45	6.18	3	1	214.4	60.7	55.9	4.8	59	82	261	10	19			
			E&M Service Area 10	S1	L	Y	1.56	1.86	3	1	28.6	59.5	55.8	3.7	57.1	72	230	10	10			
			E&M Service Area 10	S2	L	Y	7.86	1.86	3	1	65.5	57.2	56.9	0.3	54.2	72	230	10	10			
			E&M Service Area 9	S3	L	N ⁽ⁱⁱ⁾	5.90	1.40	3	1	49.5	55.3	55.1	0.2	52.3	69	230	-				
			Dog house	S4	L	N ⁽ⁱⁱ⁾	0.8	0.8	2	2	N/A	67.8	56.5	11.3	67.8	82	225	-				
			LV Switch Room	W1	L	Y	0.80	0.80	3	1	19.0	61.7	54	7.7	60.9	74	225	0	22			

Remarks:

(i) Tunnel ventilation would only be operated for either northbound (N/B) or southbound (S/B) direction under normal scenario.

(ii) The plant would be operated during day and evening time only under normal scenario.

(iii) Method 2 Far field method for Louvres or Plants
Method 3 Near field method for Louvres or Plants

(iv) Results are averaged from the measured noise levels.

(v) If the difference between the background and the measured noise level is less than 3.0 dB, background noise correction factor should be capped to 3.0 dB.

(vi) The calculation of SWL is in accordance with the methodology described in **Section 3.1.1** and **Appendix A1** of the Report. For Method 3, K2A was not claimed in the calculation.

(vii) A canopy with acoustic lining will be provided at the southern façade of NCV for screening the fixed plant noise from the southern louvres to Block 1.

Night Time Fixed Plant Noise at NSR

NSR		Noise Source	Description	Louvre ID	Plant or Louvre? (P/L)	In operation? (Y/N)	Louvre Size (m)		Method ⁽ⁱⁱ⁾	Measure-ment Distance, D_M (m)	Surface Area of Measurement Box, S (m ²)	Measured L_{Aeq} [dB(A)] ⁽ⁱⁱⁱ⁾	Average Background L_{Aeq} [dB(A)]	Difference L_{Aeq} [dB(A)]	Background Corrected Measured $L_{Aeq,mea}$ [dB(A)] ^(iv)	Calculated SWL L_{Aeq} [dB(A)] ^(v)	Distance from Noise Source to NSR, D_N [m]	Correction for line of sight, LoS [dB(A)]	Corrected SPL at NSR [dB(A)]	Cumulative SPL at NSR [dB(A)]	Night Time Criteria [dB(A)]	Exceedance [dB(A)]
							Width	Height														
NC10	St. Margaret's Coeducational English Secondary & Primary School	Ventilation Shaft for S/B ⁽ⁱ⁾ and Building Service	Tunnel ventilation shaft	N1	L	Y	18.30	5.65	3	3	498.8	57.2	54	3.2	54.4	81	141	0	33	35	50	0
			FS Control Room	N2	L	Y	2.44	0.55	3	1	25.3	54.8	49.6	5.2	53.2	67	141	0	19			
			E&M Service Area 8	N3	L	Y	3.16	5.61	3	1	64.8	61.2	55.8	5.4	59.7	78	141	0	30			
			Tunnel ventilation shaft	E1	L	Y	17.45	6.18	3	1	214.4	60.7	55.9	4.8	59	82	137	-				
			E&M Service Area 10	S1	L	Y	1.56	1.86	3	1	28.6	59.5	55.8	3.7	57.1	72	151	10	13			
			E&M Service Area 10	S2	L	Y	7.86	1.86	3	1	65.5	57.2	56.9	0.3	54.2	72	151	10	13			
			E&M Service Area 9	S3	L	N ⁽ⁱⁱ⁾	5.90	1.40	3	1	49.5	55.3	55.1	0.2	52.3	69	151	-				
			Dog house	S4	L	N ⁽ⁱⁱ⁾	0.8	0.8	2	2	N/A	67.8	56.5	11.3	67.8	82	170	-				
			LV Switch Room	W1	L	Y	0.80	0.80	3	1	19.0	61.7	54	7.7	60.9	74	164	10	15			
NC11	Tack Ching Girls' Secondary School	Ventilation Shaft for S/B ⁽ⁱ⁾ and Building Service	Tunnel ventilation shaft	N1	L	Y	18.30	5.65	3	3	498.8	57.2	54	3.2	54.4	81	141	0	33	36	50	0
			FS Control Room	N2	L	Y	2.44	0.55	3	1	25.3	54.8	49.6	5.2	53.2	67	136	0	19			
			E&M Service Area 8	N3	L	Y	3.16	5.61	3	1	64.8	61.2	55.8	5.4	59.7	78	136	0	30			
			Tunnel ventilation shaft	E1	L	Y	17.45	6.18	3	1	214.4	60.7	55.9	4.8	59	82	163	-				
			E&M Service Area 10	S1	L	Y	1.56	1.86	3	1	28.6	59.5	55.8	3.7	57.1	72	135	10	14			
			E&M Service Area 10	S2	L	Y	7.86	1.86	3	1	65.5	57.2	56.9	0.3	54.2	72	135	10	14			
			E&M Service Area 9	S3	L	N ⁽ⁱⁱ⁾	5.90	1.40	3	1	49.5	55.3	55.1	0.2	52.3	69	135	-				
			Dog house	S4	L	N ⁽ⁱⁱ⁾	0.8	0.8	2	2	N/A	67.8	56.5	11.3	67.8	82	133	-				
			LV Switch Room	W1	L	Y	0.80	0.80	3	1	19.0	61.7	54	7.7	60.9	74	128	0	27			
NC11e	Planned development (site 6), Block 1 ^(vi)	Ventilation Shaft for S/B ⁽ⁱ⁾ and Building Service	Tunnel ventilation shaft	N1	L	Y	18.30	5.65	3	3	498.8	57.2	54	3.2	54.4	81	30	10	36	42	50	0
			FS Control Room	N2	L	Y	2.44	0.55	3	1	25.3	54.8	49.6	5.2	53.2	67	30	10	22			
			E&M Service Area 8	N3	L	Y	3.16	5.61	3	1	64.8	61.2	55.8	5.4	59.7	78	30	10	33			
			Tunnel ventilation shaft	E1	L	Y	17.45	6.18	3	1	214.4	60.7	55.9	4.8	59	82	32	-				
			E&M Service Area 10	S1	L	Y	1.56	1.86	3	1	28.6	59.5	55.8	3.7	57.1	72	20	10	31			
			E&M Service Area 10	S2	L	Y	7.86	1.86	3	1	65.5	57.2	56.9	0.3	54.2	72	13	10	35			
			E&M Service Area 9	S3	L	N ⁽ⁱⁱ⁾	5.90	1.40	3	1	49.5	55.3	55.1	0.2	52.3	69	9	-				
			Dog house	S4	L	N ⁽ⁱⁱ⁾	0.8	0.8	2	2	N/A	67.8	56.5	11.3	67.8	82	16	-				
			LV Switch Room	W1	L	Y	0.80	0.80	3	1	19.0	61.7	54	7.7	60.9	74	11	10	38			
NC11f	Planned development (site 6), Block 1 ^(vi)	Ventilation Shaft for S/B ⁽ⁱ⁾ and Building Service	Tunnel ventilation shaft	N1	L	Y	18.30	5.65	3	3	498.8	57.2	54	3.2	54.4	81	29	10	37	43	50	0
			FS Control Room	N2	L	Y	2.44	0.55	3	1	25.3	54.8	49.6	5.2	53.2	67	29	10	23			
			E&M Service Area 8	N3	L	Y	3.16	5.61	3	1	64.8	61.2	55.8	5.4	59.7	78	29	10	34			
			Tunnel ventilation shaft	E1	L	Y	17.45	6.18	3	1	214.4	60.7	55.9	4.8	59	82	21					
			E&M Service Area 10	S1	L	Y	1.56	1.86	3	1	28.6	59.5	55.8	3.7	57.1	72	13	10	35			
			E&M Service Area 10	S2	L	Y	7.86	1.86	3	1	65.5	57.2	56.9	0.3	54.2	72	8	10	39			
			E&M Service Area 9	S3	L	N ⁽ⁱⁱ⁾	5.90	1.40	3	1	49.5	55.3	55.1	0.2	52.3	69	11	-				
			Dog house	S4	L	N ⁽ⁱⁱ⁾	0.8	0.8	2	2	N/A	67.8	56.5	11.3	67.8	82	25	-				
			LV Switch Room	W1	L	Y	0.80	0.80	3	1	19.0	61.7	54	7.7	60.9	74	20	10	33			

NSR		Noise Source	Description	Louvre ID	Plant or Louvre? (P/L)	In operation? (Y/N)	Louvre Size (m)		Method ⁽ⁱⁱ⁾	Measurement Distance, D_M (m)	Surface Area of Measurement Box, S (m ²)	Measured L_{Aeq} [dB(A)] ⁽ⁱⁱⁱ⁾	Average Background L_{Aeq} [dB(A)]	Difference L_{Aeq} [dB(A)]	Background Corrected Measured $L_{Aeq,mea}$ [dB(A)] ^(iv)	Calculated SWL L_{Aeq} [dB(A)] ^(v)	Distance from Noise Source to NSR, D_N [m]	Correction for line of sight, LoS [dB(A)]	Corrected SPL at NSR [dB(A)]	Cumulative SPL at NSR [dB(A)]	Night Time Criteria [dB(A)]	Exceedance [dB(A)]
							Width	Height														
NC11g	Planned development (site 6), Block 2	Ventilation Shaft for S/B ⁽ⁱ⁾ and Building Service	Tunnel ventilation shaft	N1	L	Y	18.30	5.65	3	3	498.8	57.2	54	3.2	54.4	81	50	10	32	38	50	0
			FS Control Room	N2	L	Y	2.44	0.55	3	1	25.3	54.8	49.6	5.2	53.2	67	50	10	18			
			E&M Service Area 8	N3	L	Y	3.16	5.61	3	1	64.8	61.2	55.8	5.4	59.7	78	50	10	29			
			Tunnel ventilation shaft	E1	L	Y	17.45	6.18	3	1	214.4	60.7	55.9	4.8	59	82	33	-				
			E&M Service Area 10	S1	L	Y	1.56	1.86	3	1	28.6	59.5	55.8	3.7	57.1	72	45	0	34			
			E&M Service Area 10	S2	L	Y	7.86	1.86	3	1	65.5	57.2	56.9	0.3	54.2	72	55	0	32			
			E&M Service Area 9	S3	L	N ⁽ⁱⁱ⁾	5.90	1.40	3	1	49.5	55.3	55.1	0.2	52.3	69	62	-				
			Dog house	S4	L	N ⁽ⁱⁱ⁾	0.8	0.8	2	2	N/A	67.8	56.5	11.3	67.8	82	66	-				
			LV Switch Room	W1	L	Y	0.80	0.80	3	1	19.0	61.7	54	7.7	60.9	74	71	10	22			
NC11h	Planned development (site 6), Block 2	Ventilation Shaft for S/B ⁽ⁱ⁾ and Building Service	Tunnel ventilation shaft	N1	L	Y	18.30	5.65	3	3	498.8	57.2	54	3.2	54.4	81	50	10	32	38	50	0
			FS Control Room	N2	L	Y	2.44	0.55	3	1	25.3	54.8	49.6	5.2	53.2	67	55	10	17			
			E&M Service Area 8	N3	L	Y	3.16	5.61	3	1	64.8	61.2	55.8	5.4	59.7	78	55	10	28			
			Tunnel ventilation shaft	E1	L	Y	17.45	6.18	3	1	214.4	60.7	55.9	4.8	59	82	34	-				
			E&M Service Area 10	S1	L	Y	1.56	1.86	3	1	28.6	59.5	55.8	3.7	57.1	72	47	0	34			
			E&M Service Area 10	S2	L	Y	7.86	1.86	3	1	65.5	57.2	56.9	0.3	54.2	72	55	0	32			
			E&M Service Area 9	S3	L	N ⁽ⁱⁱ⁾	5.90	1.40	3	1	49.5	55.3	55.1	0.2	52.3	69	62	-				
			Dog house	S4	L	N ⁽ⁱⁱ⁾	0.8	0.8	2	2	N/A	67.8	56.5	11.3	67.8	82	77	-				
			LV Switch Room	W1	L	Y	0.80	0.80	3	1	19.0	61.7	54	7.7	60.9	74	72	10	22			
NC16	Tower 3 Aqua Marine	Ventilation Shaft for S/B ⁽ⁱ⁾ and Building Service	Tunnel ventilation shaft	N1	L	Y	18.30	5.65	3	3	498.8	57.2	54	3.2	54.4	81	239	0	28	31	55	0
			FS Control Room	N2	L	Y	2.44	0.55	3	1	25.3	54.8	49.6	5.2	53.2	67	239	0	14			
			E&M Service Area 8	N3	L	Y	3.16	5.61	3	1	64.8	61.2	55.8	5.4	59.7	78	239	0	25			
			Tunnel ventilation shaft	E1	L	Y	17.45	6.18	3	1	214.4	60.7	55.9	4.8	59	82	261	-				
			E&M Service Area 10	S1	L	Y	1.56	1.86	3	1	28.6	59.5	55.8	3.7	57.1	72	230	10	10			
			E&M Service Area 10	S2	L	Y	7.86	1.86	3	1	65.5	57.2	56.9	0.3	54.2	72	230	10	10			
			E&M Service Area 9	S3	L	N ⁽ⁱⁱ⁾	5.90	1.40	3	1	49.5	55.3	55.1	0.2	52.3	69	230	-				
			Dog house	S4	L	N ⁽ⁱⁱ⁾	0.8	0.8	2	2	N/A	67.8	56.5	11.3	67.8	82	225	-				
			LV Switch Room	W1	L	Y	0.80	0.80	3	1	19.0	61.7	54	7.7	60.9	74	225	0	22			

Remarks:

(i) Tunnel ventilation would only be operated for either northbound (N/B) or southbound (S/B) direction under normal scenario.

(ii) The plant would be operated during day and evening time only under normal scenario.

(iii) Method 2 Far field method for Louvres or Plants
Method 3 Near field method for Louvres or Plants

(iv) Results are averaged from the measured noise levels.

(v) If the difference between the background and the measured noise level is less than 3.0 dB, background noise correction factor should be capped to 3.0 dB.

(vi) The calculation of SWL is in accordance with the methodology described in **Section 3.1.1** and **Appendix A1** of the Report. For Method 3, K2A was not claimed in the calculation.

(vii) A canopy with acoustic lining will be provided at the southern façade of NCV for screening the fixed plant noise from the southern louvres to Block 1.

NSR		Noise Source	Description	Louvre ID	Plant or Louvre? (P/L)	In operation? (Y/N)	Louvre Size (m)		Method (ii)	Measurement Distance, D_M (m)	Surface Area of Measurement Box, S (m ²)	Measured L_{Aeq} [dB(A)] (iii)	Average Background L_{Aeq} [dB(A)]	Difference L_{Aeq} [dB(A)]	Background Corrected Measured $L_{Aeq,mea}$ [dB(A)] (iv)	Calculated SWL L_{Aeq} [dB(A)] (v)	Distance from Noise Source to NSR, D_N [m]	Correction for line of sight, LoS [dB(A)]	Corrected SPL at NSR [dB(A)]	Cumulative SPL at NSR [dB(A)]	Day and Evening Time Criteria [dB(A)]	Exceedance [dB(A)]
							Width	Height														
MK1	Yau Ma Tei Catholic Primary School (Hoi Wang Road)	Ventilation Shaft for N/B ⁽ⁱ⁾ and Building Service	Tunnel ventilation shaft	N1	L	Y	10.00	8.00	3	3	404.0	60.8	53.7	7.1	59.9	86	202	0	35	38	60	0
			Tunnel ventilation shaft	N2	L	N ⁽ⁱ⁾	10.00	8.00	3	3	404.0	62.5	56	6.5	61.4	87	202	-				
			EVS	N3	L	Y	1.70	6.96	3	2	129.1	61.5	58.6	2.9	58.5	80	202	0	29			
			Harmonic Filter Room	E1	L	Y	1.24	1.24	2	3	N/A	62.3	56.9	5.4	60.8	78	222	0	26			
			Harmonic Filter Room	E2	L	Y	9.90	1.70	3	1	75.2	56.3	55.6	0.7	53.3	72	207	0	21			
			25kV Switch Room	E3	L	Y	0.75	0.75	2	2	N/A	61.1	56.9	4.2	59	73	217	0	21			
			SVS	E4	L	Y	1.70	8.70	3	2	146.0	59.6	55.6	4	57.4	79	207	0	28			
			Staircase Pressurization Fan Room 2	S1	L	Y	5.90	1.20	3	1	47.5	58.2	52.7	5.5	56.8	74	207	10	13			
			Staircase Pressurization Fan Room 1	S2	L	Y	5.90	1.20	3	1	47.5	59.2	52.7	6.5	58.1	75	207	10	14			
			Battery and Charge Room	S3	L	Y	1.0	1.0	3	1	21.0	71.3	57.8	13.5	71.3	85	237	10	23			
			Harmonic Filter Room	S4	L	Y	2.10	0.90	3	1	25.9	58.7	52.7	6	57.4	72	237	10	10			
			Fire Pump room (Electrical)	W1	L	Y	1.00	1.00	3	1	21.0	77.1	61.4	15.7	77.1	90	227	10	28			
			FHP	FHP-N1	L	Y	0.80	0.80	2	2	N/A	69.6	53.8	15.8	69.6	84	189	0				
MK3	Charming Garden Block 11	Ventilation Shaft for N/B ⁽ⁱ⁾ and Building Service	Tunnel ventilation shaft	N1	L	Y	10.00	8.00	3	3	404.0	60.8	53.7	7.1	59.9	86	268	0	32	35	60	0
			Tunnel ventilation shaft	N2	L	N ⁽ⁱ⁾	10.00	8.00	3	3	404.0	62.5	56	6.5	61.4	87	268	-				
			EVS	N3	L	Y	1.70	6.96	3	2	129.1	61.5	58.6	2.9	58.5	80	268	0	26			
			Harmonic Filter Room	E1	L	Y	1.24	1.24	2	3	N/A	62.3	56.9	5.4	60.8	78	265	0	25			
			Harmonic Filter Room	E2	L	Y	9.90	1.70	3	1	75.2	56.3	55.6	0.7	53.3	72	252	0	19			
			25kV Switch Room	E3	L	Y	0.75	0.75	2	2	N/A	61.1	56.9	4.2	59	73	260	0	20			
			SVS	E4	L	Y	1.70	8.70	3	2	146.0	59.6	55.6	4	57.4	79	252	0	26			
			Staircase Pressurization Fan Room 2	S1	L	Y	5.90	1.20	3	1	47.5	58.2	52.7	5.5	56.8	74	252	10	11			
			Staircase Pressurization Fan Room 1	S2	L	Y	5.90	1.20	3	1	47.5	59.2	52.7	6.5	58.1	75	252	10	12			
			Battery and Charge Room	S3	L	Y	1.0	1.0	3	1	21.0	71.3	57.8	13.5	71.3	85	282	10	21			
			Harmonic Filter Room	S4	L	Y	2.10	0.90	3	1	25.9	58.7	52.7	6	57.4	72	282	10	8			
			Fire Pump room (Electrical)	W1	L	Y	1.00	1.00	3	1	21.0	77.1	61.4	15.7	77.1	90	275	10	26			
			FHP	FHP-N1	L	Y	0.80	0.80	2	2	N/A	69.6	53.8	15.8	69.6	84	249	0				

Remarks:

(i) Tunnel ventilation would only be operated for either northbound (N/B) or southbound (S/B) direction under normal scenario.

(ii) Method 2 Far field method for Louvres or Plants

Method 3 Near field method for Louvres or Plants

(iii) Results are averaged from the measured noise levels.

(iv) If the difference between the background and the measured noise level is less than 3.0 dB, background noise correction factor should be capped to 3.0 dB.

(v) The calculation of SWL is in accordance with the methodology described in Section 3.1.1 and Appendix A1 of the Report. For Method 3, K2A was not claimed in the calculation.

NSR		Noise Source	Description	Louvre ID	Plant or Louvre? (P/L)	In operation? (Y/N)	Louvre Size (m)		Method (ii)	Measurement Distance, D_M (m)	Surface Area of Measurement Box, S (m ²)	Measured L_{Aeq} [dB(A)] (iii)	Average Background L_{Aeq} [dB(A)]	Difference L_{Aeq} [dB(A)]	Background Corrected Measured $L_{Aeq,mea}$ [dB(A)] (iv)	Calculated SWL L_{Aeq} [dB(A)] (v)	Distance from Noise Source to NSR, D_N [m]	Correction for line of sight, LoS [dB(A)]	Corrected SPL at NSR [dB(A)]	Cumulative SPL at NSR [dB(A)]	Day and Evening Time Criteria [dB(A)]	Exceedance [dB(A)]
						Width	Height															
MK1	Yau Ma Tei Catholic Primary School (Hoi Wang Road)	Ventilation Shaft for S/B ⁽ⁱ⁾ and Building Service	Tunnel ventilation shaft	N1	L	N ⁽ⁱ⁾	10.00	8.00	3	3	404.0	60.8	53.7	7.1	59.9	86	202	-		40	60	0
			Tunnel ventilation shaft	N2	L	Y	10.00	8.00	3	3	404.0	62.5	56	6.5	61.4	87	202	0	36			
			EVS	N3	L	Y	1.70	6.96	3	2	129.1	61.5	58.6	2.9	58.5	80	202	0	29			
			Harmonic Filter Room	E1	L	Y	1.24	1.24	2	3	N/A	62.3	56.9	5.4	60.8	78	222	0	26			
			Harmonic Filter Room	E2	L	Y	9.90	1.70	3	1	75.2	56.3	55.6	0.7	53.3	72	207	0	21			
			25kV Switch Room	E3	L	Y	0.75	0.75	2	2	N/A	61.1	56.9	4.2	59	73	217	0	21			
			SVS	E4	L	Y	1.70	8.70	3	2	146.0	59.6	55.6	4	57.4	79	207	0	28			
			Staircase Pressurization Fan Room 2	S1	L	Y	5.90	1.20	3	1	47.5	58.2	52.7	5.5	56.8	74	207	10	13			
			Staircase Pressurization Fan Room 1	S2	L	Y	5.90	1.20	3	1	47.5	59.2	52.7	6.5	58.1	75	207	10	14			
			Battery and Charge Room	S3	L	Y	1.0	1.0	3	1	21.0	71.3	57.8	13.5	71.3	85	237	10	23			
			Harmonic Filter Room	S4	L	Y	2.10	0.90	3	1	25.9	58.7	52.7	6	57.4	72	237	10	10			
			Fire Pump room (Electrical)	W1	L	Y	1.00	1.00	3	1	21.0	77.1	61.4	15.7	77.1	90	227	10	28			
			FHP	FHP-N1	L	Y	0.80	0.80	2	2	N/A	69.6	53.8	15.8	69.6	84	189	0	33			
MK3	Charming Garden Block 11	Ventilation Shaft for S/B ⁽ⁱ⁾ and Building Service	Tunnel ventilation shaft	N1	L	N ⁽ⁱ⁾	10.00	8.00	3	3	404.0	60.8	53.7	7.1	59.9	86	268	-		37	60	0
			Tunnel ventilation shaft	N2	L	Y	10.00	8.00	3	3	404.0	62.5	56	6.5	61.4	87	268	0	33			
			EVS	N3	L	Y	1.70	6.96	3	2	129.1	61.5	58.6	2.9	58.5	80	268	0	26			
			Harmonic Filter Room	E1	L	Y	1.24	1.24	2	3	N/A	62.3	56.9	5.4	60.8	78	265	0	25			
			Harmonic Filter Room	E2	L	Y	9.90	1.70	3	1	75.2	56.3	55.6	0.7	53.3	72	252	0	19			
			25kV Switch Room	E3	L	Y	0.75	0.75	2	2	N/A	61.1	56.9	4.2	59	73	260	0	20			
			SVS	E4	L	Y	1.70	8.70	3	2	146.0	59.6	55.6	4	57.4	79	252	0	26			
			Staircase Pressurization Fan Room 2	S1	L	Y	5.90	1.20	3	1	47.5	58.2	52.7	5.5	56.8	74	252	10	11			
			Staircase Pressurization Fan Room 1	S2	L	Y	5.90	1.20	3	1	47.5	59.2	52.7	6.5	58.1	75	252	10	12			
			Battery and Charge Room	S3	L	Y	1.0	1.0	3	1	21.0	71.3	57.8	13.5	71.3	85	282	10	21			
			Harmonic Filter Room	S4	L	Y	2.10	0.90	3	1	25.9	58.7	52.7	6	57.4	72	282	10	8			
			Fire Pump room (Electrical)	W1	L	Y	1.00	1.00	3	1	21.0	77.1	61.4	15.7	77.1	90	275	10	26			
			FHP	FHP-N1	L	Y	0.80	0.80	2	2	N/A	69.6	53.8	15.8	69.6	84	249	0	31			

Remarks:

(i) Tunnel ventilation would only be operated for either northbound (N/B) or southbound (S/B) direction under normal scenario.

(ii) Method 2 Far field method for Louvres or Plants

Method 3 Near field method for Louvres or Plants

(iii) Results are averaged from the measured noise levels.

(iv) If the difference between the background and the measured noise level is less than 3.0 dB, background noise correction factor should be capped to 3.0 dB.

(v) The calculation of SWL is in accordance with the methodology described in Section 3.1.1 and Appendix A1 of the Report. For Method 3, K2A was not claimed in the calculation.

Night Time Fixed Plant Noise at NSR

NSR		Noise Source	Description	Louvre ID	Plant or Louvre? (P/L)	In operation? (Y/N)	Louvre Size (m)		Method ⁽ⁱⁱⁱ⁾	Measurement Distance, D_M (m)	Surface Area of Measurement Box, S (m ²)	Measured L_{Aeq} [dB(A)] ⁽ⁱⁱⁱ⁾	Average Background L_{Aeq} [dB(A)]	Difference L_{Aeq} [dB(A)]	Background Corrected Measured $L_{Aeq,mea}$ [dB(A)] ^(iv)	Calculated SWL L_{Aeq} [dB(A)] ^(v)	Distance from Noise Source to NSR, D_N [m]	Correction for line of sight, LoS [dB(A)]	Corrected SPL at NSR [dB(A)]	Cumulative SPL at NSR [dB(A)]	Night Time Criteria [dB(A)]	Exceedance [dB(A)]
							Width	Height														
MK3	Charming Garden Block 11	Ventilation Shaft for N/B ⁽ⁱ⁾ and Building Service	Tunnel ventilation shaft	N1	L	Y	10.00	8.00	3	3	404.0	60.8	53.7	7.1	59.9	86	268	0	32	35	50	0
			Tunnel ventilation shaft	N2	L	N ⁽ⁱⁱ⁾	10.00	8.00	3	3	404.0	62.5	56	6.5	61.4	87	268	-				
			EVS	N3	L	Y	1.70	6.96	3	2	129.1	58.6	49.7	8.9	58	79	268	0	25			
			Harmonic Filter Room	E1	L	Y	1.24	1.24	2	3	N/A	62.3	56.9	5.4	60.8	78	265	0	25			
			Harmonic Filter Room	E2	L	N ⁽ⁱⁱ⁾	9.90	1.70	3	1	75.2	56.3	55.6	0.7	53.3	72	252	-				
			25kV Switch Room	E3	L	Y	0.75	0.75	2	2	N/A	61.1	56.9	4.2	59	73	260	0	20			
			SVS	E4	L	Y	1.70	8.70	3	2	146.0	59.6	55.6	4	57.4	79	252	0	26			
			Staircase Pressurization Fan Room 2	S1	L	N ⁽ⁱⁱ⁾	5.90	1.20	3	1	47.5	58.2	52.7	5.5	56.8	74	252	-				
			Staircase Pressurization Fan Room 1	S2	L	N ⁽ⁱⁱ⁾	5.90	1.20	3	1	47.5	59.2	52.7	6.5	58.1	75	252	-				
			Battery and Charge Room	S3	L	Y	1.0	1.0	3	1	21.0	71.3	57.8	13.5	71.3	85	282	10	21			
			Harmonic Filter Room	S4	L	Y	2.10	0.90	3	1	25.9	58.7	52.7	6	57.4	72	282	10	8			
			Fire Pump room (Electrical)	W1	L	Y	1.00	1.00	3	1	21.0	77.1	61.4	15.7	77.1	90	275	10	26			
			FHP	FHP-N1	L	Y	0.80	0.80	2	2	N/A	69.6	53.8	15.8	69.6	84	249	0				

Remarks:

(i) Tunnel ventilation would only be operated for either northbound (N/B) or southbound (S/B) direction under normal scenario.

(ii) The plant would be operated during day and evening time only under normal scenario.

(iii) Method 2 Far field method for Louvres or Plants

Method 3 Near field method for Louvres or Plants

(iv) Results are averaged from the measured noise levels.

(v) If the difference between the background and the measured noise level is less than 3.0 dB, background noise correction factor should be capped to 3.0 dB.

(vi) The calculation of SWL is in accordance with the methodology described in Section 3.1.1 and Appendix A1 of the Report. For Method 3, K2A was not claimed in the calculation.

Night Time Fixed Plant Noise at NSR

NSR		Noise Source	Description	Louvre ID	Plant or Louvre? (P/L)	In operation? (Y/N)	Louvre Size (m)		Method ⁽ⁱⁱⁱ⁾	Measurement Distance, D_M (m)	Surface Area of Measurement Box, S (m ²)	Measured L_{Aeq} [dB(A)] ⁽ⁱⁱⁱ⁾	Average Background L_{Aeq} [dB(A)]	Difference L_{Aeq} [dB(A)]	Background Corrected Measured $L_{Aeq,mea}$ [dB(A)] ^(iv)	Calculated SPL L_{Aeq} [dB(A)] ^(iv)	Distance from Noise Source to NSR, D_N [m]	Correction for line of sight, LoS [dB(A)]	Corrected SPL at NSR [dB(A)]	Cumulative SPL at NSR [dB(A)]	Night Time Criteria [dB(A)]	Exceedance [dB(A)]
							Width	Height														
MK3	Charming Garden Block 11	Ventilation Shaft for S/B ⁽ⁱ⁾ and Building Service	Tunnel ventilation shaft	N1	L	N ⁽ⁱⁱ⁾	10.00	8.00	3	3	404.0	60.8	53.7	7.1	59.9	86	268	-		36	50	0
			Tunnel ventilation shaft	N2	L	Y	10.00	8.00	3	3	404.0	62.5	56	6.5	61.4	87	268	0	33			
			EVS	N3	L	Y	1.70	6.96	3	2	129.1	58.6	49.7	8.9	58	79	268	0	25			
			Harmonic Filter Room	E1	L	Y	1.24	1.24	2	3	N/A	62.3	56.9	5.4	60.8	78	265	0	25			
			Harmonic Filter Room	E2	L	N ⁽ⁱⁱ⁾	9.90	1.70	3	1	75.2	56.3	55.6	0.7	53.3	72	252	-				
			25kV Switch Room	E3	L	Y	0.75	0.75	2	2	N/A	61.1	56.9	4.2	59	73	260	0	20			
			SVS	E4	L	Y	1.70	8.70	3	2	146.0	59.6	55.6	4	57.4	79	252	0	26			
			Staircase Pressurization Fan Room 2	S1	L	N ⁽ⁱⁱ⁾	5.90	1.20	3	1	47.5	58.2	52.7	5.5	56.8	74	252	-				
			Staircase Pressurization Fan Room 1	S2	L	N ⁽ⁱⁱ⁾	5.90	1.20	3	1	47.5	59.2	52.7	6.5	58.1	75	252	-				
			Battery and Charge Room	S3	L	Y	1.0	1.0	3	1	21.0	71.3	57.8	13.5	71.3	85	282	10	21			
			Harmonic Filter Room	S4	L	Y	2.10	0.90	3	1	25.9	58.7	52.7	6	57.4	72	282	10	8			
			Fire Pump room (Electrical)	W1	L	Y	1.00	1.00	3	1	21.0	77.1	61.4	15.7	77.1	90	275	10	26			
			FHP	FHP-N1	L	Y	0.80	0.80	2	2	N/A	69.6	53.8	15.8	69.6	84	249	-				

Remarks:

(i) Tunnel ventilation would only be operated for either northbound (N/B) or southbound (S/B) direction under normal scenario.

(ii) The plant would be operated during day and evening time only under normal scenario.

(iii) Method 2 Far field method for Louvres or Plants

Method 3 Near field method for Louvres or Plants

(iv) Results are averaged from the measured noise levels.

(v) If the difference between the background and the measured noise level is less than 3.0 dB, background noise correction factor should be capped to 3.0 dB.

(vi) The calculation of SWL is in accordance with the methodology described in Section 3.1.1 and Appendix A1 of the Report. For Method 3, K2A was not claimed in the calculation.

PHV - Noise Measurement Result - data

Description	Louvre ID	Scenario	Method	Location / measurement	LAeq [dB]
Tunnel ventilation shaft	N1	Normal	3	Point 1	53.6
	N1	Normal	3	Point 2	56.9
	N1	Normal	3	Point 3	56.9
	N1	Normal	3	Point 4	55.9
	N1	Normal	3	Point 5	52.8
	N1	Normal	3	Point 6	51
	N1	Normal	3	Point 7	51.9
	N1	Normal	3	Point 8	52.4
	N1	Normal	3	Point 9	52.5
	N1	Normal	3	Point 10	54.8
	N1	Normal	3	Point 11	55.9
	N1	Normal	3	Point 12	54.1
	N1	Normal	3	Point 13	51.6
	N1	Normal	3	Point 14	51.1
	N1	Normal	3	Point 15	51.8
	N1	Normal	3	Point 16	52
FS control room	N1	Normal		AVERAGE	53.9
	N2	Normal	2	measurement 1	55.6
	N2	Normal	2	measurement 2	54.7
	N2	Normal	2	measurement 3	54.7
P&D pump and tank room	N2			AVERAGE	55.0
	N3	Normal	2	measurement 1	52.9
	N3	Normal	2	measurement 2	52.8
	N3	Normal	2	measurement 3	53.1
Air duct riser	N3			AVERAGE	52.9
	N4	Normal	3	Point 1	58.2
	N4	Normal	3	Point 2	58.5
	N4	Normal	3	Point 3	58.4
	N4	Normal	3	Point 4	60.2
	N4	Normal	3	Point 5	58.4
	N4	Normal	3	Point 6	58.9
	N4	Normal	3	Point 7	56.7
	N4	Normal	3	Point 8	55.1
	N4	Normal	3	Point 9	55.5
	N4	Normal	3	Point 10	56.5
	N4	Normal	3	Point 11	56.6
	N4	Normal	3	Point 12	56.0
	N4	Normal	3	Point 13	57.5
	N4	Normal	3	Point 14	57.9
	N4	Normal	3	Point 15	58.0
Pressurization fan room	N4	Normal	3	Point 16	58.1
	N4			AVERAGE	57.7
	N5	Normal	2	measurement 1	51.2
	N5	Normal	2	measurement 2	51.2
Tunnel ventilation shaft	N5	Normal	2	measurement 3	51.2
	N5			AVERAGE	51.2
	E1	Normal	3	Point 1	53.7
	E1	Normal	3	Point 2	58.2
Tunnel ventilation shaft	E1	Normal	3	Point 3	58.3
	E1	Normal	3	Point 4	50.8
	E1	Normal	3	Point 5	52.1
	E1	Normal	3	Point 6	52.9
	E1	Normal	3	Point 7	55.4
	E1	Normal	3	Point 8	56.5
	E1	Normal	3	Point 9	56.8
	E1	Normal	3	Point 10	52
	E1	Normal	3	Point 11	52.5
	E1	Normal	3	Point 12	53
	E1			AVERAGE	55.1
	E2	Normal	3	Point 1	56.8
	E2	Normal	3	Point 2	57.4
	E2	Normal	3	Point 3	55.4
	E2	Normal	3	Point 4	54
	E2	Normal	3	Point 5	51.7
Tunnel ventilation shaft	E2	Normal	3	Point 6	51.8
	E2	Normal	3	Point 7	55.4
	E2	Normal	3	Point 8	52.7
	E2	Normal	3	Point 9	56.6
	E2	Normal	3	Point 10	53.1
	E2	Normal	3	Point 11	53.5
	E2	Normal	3	Point 12	53.9
	E2			AVERAGE	54.8
Pressurization fan room	E3	Normal	2	measurement 1	54.7
	E3	Normal	2	measurement 2	55.5
	E3	Normal	2	measurement 3	54.9

Description	Louvre ID	Scenario	Method	Location / measurement	LAeq [dB]
Smoke extract make-up fan room	E3			AVERAGE	55.0
	E4	Normal	2	measurement 1	60.7
Tunnel ventilation shaft	E4	Normal	2	measurement 2	60.9
	E4	Normal	2	measurement 3	60.9
	E4			AVERAGE	60.8
	S1	Normal	3	Point 1	53.9
	S1	Normal	3	Point 2	57.9
	S1	Normal	3	Point 3	59.4
	S1	Normal	3	Point 4	57.7
	S1	Normal	3	Point 5	54.1
	S1	Normal	3	Point 6	52.6
	S1	Normal	3	Point 7	53.7
	S1	Normal	3	Point 8	52.8
	S1	Normal	3	Point 9	54.5
	S1	Normal	3	Point 10	54.7
	S1	Normal	3	Point 11	54.7
	S1	Normal	3	Point 12	55.8
	S1	Normal	3	Point 13	56.7
UPS room	S1	Normal	3	Point 14	56
	S1	Normal	3	Point 15	56
	S1	Normal	3	Point 16	53.4
	S1			AVERAGE	55.7
SER	S2	Normal	2	measurement 1	59.0
	S2	Normal	2	measurement 2	59.0
	S2	Normal	2	measurement 3	58.9
	S2			AVERAGE	59.0
MCC room	S3	Normal	2	measurement 1	49.6
	S3	Normal	2	measurement 2	50.2
	S3	Normal	2	measurement 3	51.1
	S3			AVERAGE	50.3
Smoke extraction fan room	S4	Normal	2	measurement 1	55.6
	S4	Normal	2	measurement 2	55.2
	S4	Normal	2	measurement 3	55.0
	S4			AVERAGE	55.3
	S5	Normal	3	Point 1	67
	S5	Normal	3	Point 2	64.4
	S5	Normal	3	Point 3	60.7
	S5	Normal	3	Point 4	66.1
	S5	Normal	3	Point 5	64.2
	S5	Normal	3	Point 6	61.2
	S5	Normal	3	Point 7	65.6
	S5	Normal	3	Point 8	63.5
	S5	Normal	3	Point 9	60.2
	S5	Normal	3	Point 10	61.2
	S5	Normal	3	Point 11	60.7
	S5	Normal	3	Point 12	60.3
ABBCS room	S5	Normal	3	Point 13	63.7
	S5	Normal	3	Point 14	64.3
	S5	Normal	3	Point 15	66.5
	S5	Normal	3	Point 16	65.7
	S5			AVERAGE	64.1
	W1	Normal	2	measurement 1	51.4
	W1	Normal	2	measurement 2	51.2
	W1	Normal	2	measurement 3	50.8
Smoke extraction fan room	W1			AVERAGE	51.1
	W2	Normal	3	Point 1	64.9
	W2	Normal	3	Point 2	64.8
	W2	Normal	3	Point 3	68.3
	W2	Normal	3	Point 4	66.4
	W2	Normal	3	Point 5	69.3
	W2	Normal	3	Point 6	69.9
	W2	Normal	3	Point 7	63.7
	W2	Normal	3	Point 8	66.6
	W2	Normal	3	Point 9	68.2
	W2	Normal	3	Point 10	63.0
	W2	Normal	3	Point 11	62.7
	W2	Normal	3	Point 12	64.1
	W2	Normal	3	Point 13	65.1
	W2	Normal	3	Point 14	67.6
	W2	Normal	3	Point 15	68.5
Smoke extraction fan room	W2	Normal	3	Point 16	68.0
	W2			AVERAGE	66.9

NCV - Noise Measurement Result - data

Description	Louvre ID	Scenario	Method	Location / measurement	LAeq [dB]
Tunnel ventilation shaft	N1	Normal	3	Point 1	59.5
	N1	Normal	3	Point 2	60.7
	N1	Normal	3	Point 3	60.8
	N1	Normal	3	Point 4	60.7
	N1	Normal	3	Point 5	60.6
	N1	Normal	3	Point 6	61.1
	N1	Normal	3	Point 7	60.8
	N1	Normal	3	Point 8	59.1
	N1	Normal	3	Point 9	61.7
	N1	Normal	3	Point 10	62.2
	N1	Normal	3	Point 11	61.6
	N1	Normal	3	Point 12	61.7
	N1	Normal	3	Point 13	61.1
	N1	Normal	3	Point 14	60.4
	N1	Normal	3	Point 15	60.1
	N1	Normal	3	Point 16	58.6
	N1	Normal	3	Point 17	59.4
	N1	Normal	3	Point 18	61.5
	N1	Normal	3	Point 19	61.8
	N1	Normal	3	Point 20	60.9
	N1	Normal	3	Point 21	63.1
	N1	Normal	3	Point 22	62.8
	N1	Normal	3	Point 23	62.7
	N1	Normal	3	Point 24	63.9
	N1	Normal	3	Point 25	61.3
	N1	Normal	3	Point 26	60.6
	N1	Normal	3	Point 27	60.2
	N1	Normal	3	Point 28	60.2
	N1	Normal	3	Point 29	59.7
	N1	Normal	3	Point 30	59.8
	N1	Normal	3	Point 31	59.1
	N1	Normal	3	Point 32	58.4
	N1	Normal	3	Point 33	57.3
	N1	Normal	3	Point 34	58.8
	N1	Normal	3	Point 35	58.6
	N1	Normal	3	Point 36	58.5
	N1	Normal	3	Point 37	60.4
	N1	Normal	3	Point 38	59.6
	N1	Normal	3	Point 39	60.8
	N1	Normal	3	Point 40	60.7
	N1	Normal	3	Point 41	56.4
FS Control Room	N1			AVERAGE	60.7
	N2	Normal	3	Point 1	54.3
	N2	Normal	3	Point 2	54.6
	N2	Normal	3	Point 3	55.1
	N2	Normal	3	Point 4	54.6
	N2	Normal	3	Point 5	55.1
	N2	Normal	3	Point 6	54.9
	N2	Normal	3	Point 7	54.0
E&M Service Area 8	N2	Normal	3	Point 8	55.9
	N2			AVERAGE	54.8
	N3	Normal	3	Point 1	60.6
	N3	Normal	3	Point 2	64.7
	N3	Normal	3	Point 3	56.7
	N3	Normal	3	Point 4	62.9
	N3	Normal	3	Point 5	61.4
	N3	Normal	3	Point 6	61.5
	N3	Normal	3	Point 7	59.5
	N3	Normal	3	Point 8	63.8
	N3	Normal	3	Point 9	61.2
	N3	Normal	3	Point 10	57.1
	N3	Normal	3	Point 11	57.9
	N3	Normal	3	Point 12	61.4
	N3	Normal	3	Point 13	62.5
	N3	Normal	3	Point 14	60.3
Tunnel ventilation shaft	N3	Normal	3	Point 15	60.5
	N3	Normal	3	Point 16	58.9
	N3			AVERAGE	61.2
	E1	Normal	3	Point 1	58.8
	E1	Normal	3	Point 2	58.4
	E1	Normal	3	Point 3	57.8
	E1	Normal	3	Point 4	57.2
	E1	Normal	3	Point 5	55.7
	E1	Normal	3	Point 6	56.6
	E1	Normal	3	Point 7	56.3

Description	Louvre ID	Scenario	Method	Location / measurement	LAeq [dB]
	E1	Normal	3	Point 8	57.4
	E1	Normal	3	Point 9	57.5
	E1	Normal	3	Point 10	59
	E1	Normal	3	Point 11	58
	E1	Normal	3	Point 12	57.1
	E1	Normal	3	Point 13	55.5
	E1	Normal	3	Point 14	55.7
	E1	Normal	3	Point 15	56.1
	E1	Normal	3	Point 16	56.4
	E1			AVERAGE	57.2
Tunnel ventilation shaft	S1	Normal	3	Point 1	57.6
	S1	Normal	3	Point 2	58.2
	S1	Normal	3	Point 3	57.5
	S1	Normal	3	Point 4	59.2
	S1	Normal	3	Point 5	59.4
	S1	Normal	3	Point 6	58.5
	S1	Normal	3	Point 7	57.3
	S1	Normal	3	Point 8	60.8
	S1	Normal	3	Point 9	60.8
	S1	Normal	3	Point 10	58.4
	S1	Normal	3	Point 11	62.2
	S1	Normal	3	Point 12	61.1
E&M Service Area 10	S1			AVERAGE	59.5
	S2	Normal	3	Point 1	55.8
	S2	Normal	3	Point 2	55.0
	S2	Normal	3	Point 3	56.2
	S2	Normal	3	Point 4	58.4
	S2	Normal	3	Point 5	57.9
	S2	Normal	3	Point 6	57.8
	S2	Normal	3	Point 7	56.7
	S2	Normal	3	Point 8	57.8
	S2	Normal	3	Point 9	57.7
	S2	Normal	3	Point 10	58.4
	S2	Normal	3	Point 11	56.5
	S2	Normal	3	Point 12	57.4
	S2	Normal	3	Point 13	58.6
	S2	Normal	3	Point 14	57.1
	S2	Normal	3	Point 15	57.3
E&M Service Area 9	S2	Normal	3	Point 16	56.3
	S2			AVERAGE	57.3
	S3	Normal	3	Point 1	54.9
	S3	Normal	3	Point 2	56.2
	S3	Normal	3	Point 3	54.9
	S3	Normal	3	Point 4	55.0
	S3	Normal	3	Point 5	56.7
	S3	Normal	3	Point 6	55.9
	S3	Normal	3	Point 7	55.6
	S3	Normal	3	Point 8	54.8
	S3	Normal	3	Point 9	54.6
	S3	Normal	3	Point 10	55.3
	S3	Normal	3	Point 11	55.6
	S3	Normal	3	Point 12	55.6
	S3	Normal	3	Point 13	55.3
	S3	Normal	3	Point 14	54.3
Dog house	S3	Normal	3	Point 15	55.3
	S3	Normal	3	Point 16	53.8
	S3			AVERAGE	55.3
	S4	Normal	2	measurement 1	67.8
LV Switch Room	S4	Normal	2	measurement 2	67.8
	S4	Normal	2	measurement 3	67.8
	S4			AVERAGE	67.8
	W1	Normal	3	Point 1	61
	W1	Normal	3	Point 2	62.9
	W1	Normal	3	Point 3	61.5
	W1	Normal	3	Point 4	62.1
	W1	Normal	3	Point 5	60.7
	W1			AVERAGE	61.7

MKV - Noise Measurement Result - data

Description	Louvre ID	Scenario	Method	Location / measurement	LAeq [dB]
Tunnel ventilation shaft	N1	Normal	3	Point 1	59.7
	N1	Normal	3	Point 2	63.7
	N1	Normal	3	Point 3	63.7
	N1	Normal	3	Point 4	58
	N1	Normal	3	Point 5	59
	N1	Normal	3	Point 6	60.8
	N1	Normal	3	Point 7	60.6
	N1	Normal	3	Point 8	59
	N1	Normal	3	Point 9	60.3
	N1	Normal	3	Point 10	59.8
	N1	Normal	3	Point 11	59.5
	N1	Normal	3	Point 12	61
	N1			AVERAGE	60.8
Tunnel ventilation shaft	N2	Normal	3	Point 1	62.9
	N2	Normal	3	Point 2	63.6
	N2	Normal	3	Point 3	63.8
	N2	Normal	3	Point 4	63.6
	N2	Normal	3	Point 5	61.8
	N2	Normal	3	Point 6	62.0
	N2	Normal	3	Point 7	61.9
	N2	Normal	3	Point 8	61.1
	N2	Normal	3	Point 9	61.6
	N2	Normal	3	Point 10	62.4
	N2	Normal	3	Point 11	62.2
	N2	Normal	3	Point 12	62.1
	N2			AVERAGE	62.5
EVS	N3	Normal	3	Point 1	59.5
	N3	Normal	3	Point 2	60.1
	N3	Normal	3	Point 3	61.3
	N3	Normal	3	Point 4	60.3
	N3	Normal	3	Point 5	63.2
	N3	Normal	3	Point 6	63.2
	N3	Normal	3	Point 7	61.8
	N3	Normal	3	Point 8	61.5
	N3			AVERAGE	61.6
Harmonic Filter Room	E1	Normal	2	measurement 1	62.3
	E1	Normal	2	measurement 2	62.3
	E1	Normal	2	measurement 3	62.3
	E1			AVERAGE	62.3
Harmonic Filter Room	E2	Normal	3	Point 1	54.5
	E2	Normal	3	Point 2	54.6
	E2	Normal	3	Point 3	56.7
	E2	Normal	3	Point 4	57.1
	E2	Normal	3	Point 5	58.8
	E2	Normal	3	Point 6	56.5
	E2	Normal	3	Point 7	54.5
	E2	Normal	3	Point 8	55.4
	E2	Normal	3	Point 9	57.4
	E2	Normal	3	Point 10	56.1
	E2	Normal	3	Point 11	56.0
	E2	Normal	3	Point 12	56.9
	E2	Normal	3	Point 13	55.2
	E2	Normal	3	Point 14	55.4
	E2	Normal	3	Point 15	55.1
	E2	Normal	3	Point 16	56.2
	E2	Normal	3	Point 17	51.7
	E2	Normal	3	Point 18	58.7
	E2	Normal	3	Point 19	57.1
	E2	Normal	3	Point 20	56.6
	E2			AVERAGE	56.3
25kV Switch Room	E3	Normal	2	measurement 1	60.9
	E3	Normal	2	measurement 2	61
	E3	Normal	2	measurement 3	61.3
	E3			AVERAGE	61.1
SVS	E4	Normal	3	Point 1	59.4
	E4	Normal	3	Point 2	60.3
	E4	Normal	3	Point 3	60.6
	E4	Normal	3	Point 4	60.7
	E4	Normal	3	Point 5	61.5
	E4	Normal	3	Point 6	61
	E4	Normal	3	Point 7	59.6
	E4	Normal	3	Point 8	57
	E4	Normal	3	Point 9	57.6

Description	Louvre ID	Scenario	Method	Location / measurement	LAeq [dB]
SUBSTANT FURNISHING ROOM Elev. 0.00m - 3	E4	Normal	3	Point 10	57.6
	E4	Normal	3	Point 11	57.2
	E4			AVERAGE	59.6
	S1	Normal	3	Point 1	55.7
	S1	Normal	3	Point 2	56.2
	S1	Normal	3	Point 3	61.3
	S1	Normal	3	Point 4	57.7
	S1	Normal	3	Point 5	57.9
	S1	Normal	3	Point 6	58.8
	S1	Normal	3	Point 7	58.6
	S1	Normal	3	Point 8	57.9
	S1	Normal	3	Point 9	59.5
	S1	Normal	3	Point 10	60.2
	S1	Normal	3	Point 11	58.1
	S1	Normal	3	Point 12	59
	S1	Normal	3	Point 13	55.4
SUBSTANT FURNISHING ROOM Elev. 0.00m - 1	S1	Normal	3	Point 14	56.3
	S1	Normal	3	Point 15	56.6
	S1	Normal	3	Point 16	57
	S1			AVERAGE	58.2
	S2	Normal	3	Point 1	60.5
	S2	Normal	3	Point 2	59.5
	S2	Normal	3	Point 3	55.8
	S2	Normal	3	Point 4	56.9
	S2	Normal	3	Point 5	57.5
	S2	Normal	3	Point 6	59.8
	S2	Normal	3	Point 7	61.1
	S2	Normal	3	Point 8	59.6
	S2	Normal	3	Point 9	59.2
	S2	Normal	3	Point 10	59.5
	S2	Normal	3	Point 11	59.9
	S2	Normal	3	Point 12	57.4
Battery and Charge Room	S2	Normal	3	Point 13	58.4
	S2	Normal	3	Point 14	57.9
	S2	Normal	3	Point 15	61.1
	S2	Normal	3	Point 16	59.9
	S2			AVERAGE	59.2
	S3	Normal	3	Point 1	70.2
	S3	Normal	3	Point 2	73.7
	S3	Normal	3	Point 3	71.5
TECS control room	S3	Normal	3	Point 4	70.1
	S3	Normal	3	Point 5	69.7
	S3			AVERAGE	71.3
	S4	Normal	3	Point 1	59.5
	S4	Normal	3	Point 2	55.8
	S4	Normal	3	Point 3	57.5
	S4	Normal	3	Point 4	59.6
	S4	Normal	3	Point 5	57.4
FIRE PUMP ROOM (Elev. 0.00m - 1)	S4	Normal	3	Point 6	58.4
	S4	Normal	3	Point 7	57.9
	S4	Normal	3	Point 8	61.1
	S4			AVERAGE	58.7
	W1	Normal	3	Point 1	78
	W1	Normal	3	Point 2	77.6
	W1	Normal	3	Point 3	77.4
	W1	Normal	3	Point 4	76
FHP	W1	Normal	3	Point 5	75.9
	W1			AVERAGE	77.1
	FHP-N1	Normal	2	measurement 1	69.9
	FHP-N1	Normal	2	measurement 2	69.4
	FHP-N1	Normal	2	measurement 3	69.6
	FHP-N1			AVERAGE	69.6

Appendix A4 – Results on Tonality, Impulsiveness and Intermittency

Appendix A4 - Results on Tonality, Impulsiveness and Intermittency

NSR	Scenario	Measurement Type	Start Time	End Time	L _{Aeq} , dB(A)
PH1a	Day and Evening Time	Background Noise Levels	21:56	22:01	52.6
			22:01	22:06	53.0
		Measured Noise Levels	22:19	22:49	51.7
			22:50	23:20	50.4
	Night-time	Background Noise Levels	00:47	00:52	49.3
			00:52	00:57	48.2
		Measured Noise Levels	23:28	23:58	49.9
			23:58	00:28	49.1
PH1b	Day and Evening Time	Background Noise Levels	22:00	22:05	46.1
			22:05	22:10	45.7
		Measured Noise Levels	22:23	22:53	46.6
			22:53	23:23	46.4
	Night-time	Background Noise Levels*	00:50	00:55	47.8
			00:57	01:02	43.9
		Measured Noise Levels	23:38	00:08	46.7
			00:08	00:13	47.1
PH4	Day and Evening Time	Background Noise Levels	21:56	22:02	46.7
			22:03	22:09	46.2
		Measured Noise Levels	22:20	22:50	45.9
			22:51	23:21	45.1
	Night-time	Background Noise Levels	00:48	00:53	42.5
			00:54	01:00	43.0
		Measured Noise Levels	23:26	23:56	44.7
			00:02	00:32	44.9
NC11	Day and Evening Time	Background Noise Levels	21:40	21:45	65.7
			21:54	21:59	65.3
		Measured Noise Levels	22:30	23:00	65.9
			23:02	23:32	65.3
	Night-time	Background Noise Levels	00:44	00:49	63.9
			00:50	00:55	64.4
		Measured Noise Levels	23:38	00:08	66.4
			00:09	00:39	66.3
NC11f	Day and Evening Time	Background Noise Levels	22:01	22:06	60.0
			22:07	22:12	59.8
		Measured Noise Levels	22:23	22:53	60.3
			22:55	23:25	59.6
	Night-time	Background Noise Levels	00:38	00:43	57.4
			00:44	00:49	57.4
		Measured Noise Levels	23:31	00:01	58.9
			00:02	00:32	58.8
NC11g	Day and Evening Time	Background Noise Levels	21:51	21:56	60.4
			22:07	22:12	60.1
		Measured Noise Levels	22:22	22:52	60.5
			22:53	23:23	59.5
	Night-time	Background Noise Levels	00:39	00:44	56.7
			00:44	00:49	57.9
		Measured Noise Levels	23:31	00:01	59.0
			00:01	00:31	58.7
MK1	Day and Evening Time	Background Noise Levels	21:24	21:29	63.9
			21:35	21:40	63.6
		Measured Noise Levels	21:54	22:24	64.3
			22:25	22:55	63.3
	Night-time	Background Noise Levels	00:00	00:05	62.2
			00:09	00:14	59.4
		Measured Noise Levels	00:47	01:17	58.5
			01:20	01:50	57.2

Note:

On-site observations indicated there was community noise emitted from NSR PH1b during 00:50 – 00:55, and no noticeable noise during 00:57 – 01:02, therefore there were differences in noise levels between the two periods.