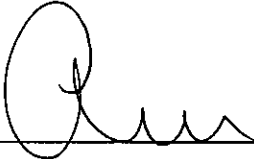


MTR Corporation Limited

Kwun Tong Line Extension (KTE)

Revised Noise Audit Report  
to Confirm the Compliance  
of Design of Fixed Plant Noise Sources

Verified by:  \_\_\_\_\_


Position: Independent Environmental Checker

Date: 22 Sept 2016

MTR Corporation Limited

Kwun Tong Line Extension (KTE)

Revised Noise Audit Report  
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Certified by:  \_\_\_\_\_

Position: Environmental Team Leader

Date: 22 SEP 2016

MTR Corporation Limited

MTR Kwun Tong Line Extension  
(KTE):

*Fixed Plant Noise Audit Report*

September 2016

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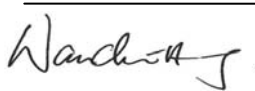
<http://www.erm.com>

MTR Corporation Limited

MTR Kwun Tong Line Extension  
(KTE):  
*Fixed Plant Noise Audit Report*

September 2016

Reference 0132172

For and on behalf of ERM-Hong Kong, Limited
Approved by: <u>Frank Wan</u>
Signed: <u></u>
Position: <u>Partner</u>
Date: <u>22 September 2016</u>

This report has been prepared by ERM-Hong Kong, Limited with all reasonable skill, care and diligence within the terms of the Contract with the client, incorporating our General Terms and Conditions of Business and taking account of the resources devoted to it by agreement with the client.

We disclaim any responsibility to the client and others in respect of any matters outside the scope of the above.

This report is confidential to the client and we accept no responsibility of whatsoever nature to third parties to whom this report, or any part thereof, is made known. Any such party relies on the report at their own risk.



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Following the approval of the Kwun Tong Line Extension (hereafter referred to as the KTE Project) Environmental Impact Assessment (EIA) Report <sup>(1)</sup> under the *Environmental Impact Assessment Ordinance (EIAO)* on 19 August 2010, an Environmental Permit (EP-399/2010) was granted for the KTE Project on 27 September 2010. The EP has been varied and the latest EP (EP-399/2010/D) was issued on 16 February 2016 to include updated maximum sound power levels for the fixed plant noise sources as presented in the *Environmental Review Report (ERR)* for supporting the Variation of EP.

Condition 4.6 in Part C of the current EP (EP-399/2010/D) requires that “*At least one month before the commencement of operation of the Project, the Permit Holder shall carry out audit and confirm in writing to the Director that the design of the fixed plant noise sources associated with the Project complies with the maximum sound power levels determined in the EIA Report (Register No. AEIAR-154/2010) and all relevant documents in the Register, or otherwise approved by the Director in compliance with the requirements in the Technical Memorandum on Environmental Impact Assessment Process having due regard to the characteristics of tonality, impulsiveness and intermittency. The audit report shall be certified by the ET Leader and verified by the IEC*”.

In accordance with the above EP Condition, MTR Corporation Limited (MTRCL) submitted a *Proposal for Updating the Maximum Sound Power Levels for Fixed Plant Noise Sources (Proposal for Updating SWLs)* in August 2016 and it was approved by EPD on 29 August 2016.

ERM-Hong Kong, Limited (ERM) was appointed by MTRCL to prepare the fixed plant noise audit report for the noise measurement at the fixed plant noise sources to check the compliance of the maximum sound power levels (SWLs) and to undertake noise measurement at the identified representative Noise Sensitive Receivers (NSRs) for investigation of any tonal, impulsive and intermittent characteristics from the fixed plant noise sources installed at the KTE Project.

This *Report* presents the noise measurement methodology and results of noise measurement at the fixed plant noise sources of Wylie Road Ancillary Building (WAB), Ho Man Tin Station (HOM), Whampoa Station (WHA) and at the representative NSRs near these three locations, and check compliance by comparing the results with the maximum sound power levels determined in the approved KTE EIA report and ERR.

(1) Kwun Tong Line Extension Environmental Impact Assessment Report (Register No.: AEIAR-154/2010) (KTE EIA Report)

## 2.1 NOISE MEASUREMENT TO OBTAIN THE SWLS OF FIXED PLANT NOISE SOURCES

Fixed plant sources, including ventilation fans, chillers and coolers, would be located within plant rooms and the noise from these fixed plant sources would be emitted through the louvers. The measured noise level at each louver during the commissioning test shall comply with the maximum allowable SWLs as summarised in Table 2.1 which is based on Table 2.2 of the Proposal for Updating SWLs. Layout and section plans of the fixed plant sources are shown in Annex A1. Appropriate corrections in tonal, impulsive or intermittent characteristics should be applied, where applicable, in accordance with the IND-TM during the commissioning test.

Table 2.1 Summary of Updated Maximum Allowable SWLs for Fixed Plant Sources

Plant Item <sup>(a)(b)</sup>	Description	Maximum Allowable SWL, dB(A)	
		Daytime	Night-time
<b>WAB</b>			
VSWAB-1A	Louvre for Ventilation Building	88	83
VSWAB-1B <sup>(c)</sup>	Louvre for Ventilation Building	96	--
VSWAB-2	Louvre for Ventilation Building	95	85
VSWAB-3 <sup>(c)</sup>	Louvre for Ventilation Building	95	--
VSWAB-4	Louvre for Ventilation Building	95	93
VSWAB-5A	Louvre for Ventilation Building	93	83
VSWAB-5B	Louvre for Ventilation Building	93	83
VSWAB-6A	Louvre for Ventilation Building	94	84
VSWAB-6B	Louvre for Ventilation Building	94	84
VSWAB-7A	Louvre for Ventilation Building	95	93
VSWAB-7B	Louvre for Ventilation Building	95	93
VSWAB-8 <sup>(b)</sup>	Louvre for Ventilation Building	--	--
VSWAB-10	Louvre for Ventilation Building	94	92
<b>HOM</b>			
A1 <sup>(a)</sup>	SCL Tunnel Ventilation Louvre	93	83
A2 <sup>(a)</sup>	SCL Tunnel Ventilation Louvre	93	83
A3 <sup>(a)</sup>	SCL Tunnel Ventilation Louvre	88	78
A4 <sup>(a)</sup>	SCL Tunnel Ventilation Louvre	88	78
A5 <sup>(a)</sup>	SCL Tunnel Ventilation Louvre	88	78
A6 <sup>(a)</sup>	SCL Tunnel Ventilation Louvre	86	76
B1 <sup>(a)</sup>	SCL Tunnel Ventilation Louvre	94	84
B2 <sup>(a)</sup>	SCL Tunnel Ventilation Louvre	94	84
B3a	Station Ventilation Louvre	93	86
B3b	Station Ventilation Louvre	93	86
B4 <sup>(c)</sup>	Tunnel Ventilation Louvre	98	--
B4a	Station Ventilation Louvre	91	82
B5	Station Ventilation Louvre	92	83
B6 <sup>(c)</sup>	Tunnel Ventilation Louvre	95	--
B7 <sup>(c)</sup>	Tunnel Ventilation Louvre	95	--
B8 <sup>(c)</sup>	Tunnel Ventilation Louvre	90	--
B9	Station Ventilation Louvre	95	85
B10 <sup>(c)</sup>	Station Ventilation Louvre	82	--

Plant Item <sup>(a)(b)</sup>	Description	Maximum Allowable SWL, dB(A)	
B11 (c)	Station Ventilation Louvre	85	--
C1a	Station Ventilation Louvre	90	80
C1b	Station Ventilation Louvre	94	81
C2a	Station Ventilation Louvre	90	80
C2b	Station Ventilation Louvre	92	82
C2c (c)	Station Ventilation Louvre	78	--
C2d	Station Ventilation Louvre	92	83
C2e	Station Ventilation Louvre	92	83
C3	Station Ventilation Louvre	91	86
C4	Station Ventilation Louvre	93	81
C4a	Station Ventilation Louvre	93	89
C5	Station Ventilation Louvre	93	84
C6	Station Ventilation Louvre	94	80
C7a (b)	Station Ventilation Louvre	--	--
C7b (b)	Station Ventilation Louvre	--	--
C7c (c)	Station Ventilation Louvre	85	--
C7d (b)	Station Ventilation Louvre	--	--
D1	Tunnel Ventilation Louvre	92	90
D2	Tunnel Ventilation Louvre	88	88
D3	Station Ventilation Louvre	95	85
D4 (b)	Station Ventilation Louvre	--	--
D5	Station Ventilation Louvre	93	83
D6	Station Ventilation Louvre	94	86
D7	Station Ventilation Louvre	93	83
D8 (c)	Station Ventilation Louvre	91	--
D9	Station Ventilation Louvre	86	78
D10	Station Ventilation Louvre	84	78
D11	Station Ventilation Louvre	85	78
E1	Station Ventilation Louvre	88	80
E2	Station Ventilation Louvre	87	78
E3	Station Ventilation Louvre	86	79
E4	Station Ventilation Louvre	85	77
E5-1	Tunnel Ventilation Louvre	88	82
E5-2 (b)	Tunnel Ventilation Louvre	--	--
E5-3 (a)	SCL Tunnel Ventilation Louvre	80	70
F1	Station Ventilation Louvre	85	75
F1a	Station Ventilation Louvre	84	74
F1b	Station Ventilation Louvre	84	81
F1c	Station Ventilation Louvre	80	75
F1d (c)	Station Ventilation Louvre	82	--
F1e (b)	Station Ventilation Louvre	--	--
F2 (a)	SCL Tunnel Ventilation Louvre	85	75
F3a	Station Ventilation Louvre	87	77
F3b	Station Ventilation Louvre	86	76
F3c (b)	Station Ventilation Louvre	--	--
F3d	Station Ventilation Louvre	86	76
F3e (b)	Station Ventilation Louvre	--	--
F4a (d)	Station Ventilation Louvre	87	--
F4b (d)	Station Ventilation Louvre	--	70
G1 (a)	SCL Tunnel Ventilation Shaft	87	77
G2 (a)	SCL Tunnel Ventilation Shaft	87	77
G3 (a)	SCL Tunnel Ventilation Shaft	81	71

<b>Plant Item<sup>(a)(b)</sup></b>	<b>Description</b>	<b>Maximum Allowable SWL, dB(A)</b>	
G4 (a)	SCL Tunnel Ventilation Shaft	78	68
G5 (a)	SCL Tunnel Ventilation Shaft	78	68
H1 (c)(e)	Tunnel Ventilation Shaft	92	--
H2 (c)(e)	Tunnel Ventilation Shaft	92	--
H3 (c)(e)	Tunnel Ventilation Shaft	91	--
H4 (c)(e)	Tunnel Ventilation Shaft	90	--
I1 (c)(e)	Tunnel Ventilation Shaft	97	--
I2 (c)(e)	Tunnel Ventilation Shaft	97	--
I3 (c)(e)	Tunnel Ventilation Shaft	91	--
I4 (c)(e)	Tunnel Ventilation Shaft	91	--
J1 (b)	Station Ventilation Louvre	--	--
J2 (b)	Station Ventilation Louvre	--	--
J3	Station Ventilation Louvre	86	76
J4	Station Ventilation Louvre	83	76
J5	Station Ventilation Louvre	83	75
J6	Station Ventilation Louvre	86	76
J7 (b)	Station Ventilation Louvre	--	--
K1a (b)	Station Ventilation Louvre	--	--
K1b	Station Ventilation Louvre	89	86
K2 (b)	Station Ventilation Louvre	--	--
K3 (c)	Station Ventilation Louvre	91	--
K4 (c)	Station Ventilation Louvre	90	--
K5 (c)	Station Ventilation Louvre	94	--
K6 (c)	Station Ventilation Louvre	95	--
<b>WHA</b>			
1-1a (c)	Tunnel Ventilation Louvre	94	--
1-2a (c)	Station Ventilation Louvre	90	--
1-2b	Tunnel Ventilation Louvre	86	84
1-3a (c)	Station Ventilation Louvre	81	--
1-3b	Station Ventilation Louvre	81	74
1-3c	Station Ventilation Louvre	85	75
1-3d	Tunnel Ventilation Louvre	85	78
1-4a (c)	Station Ventilation Louvre	90	--
1-6c	Station Ventilation Louvre	83	77
1-6a (c)	Tunnel Ventilation Louvre	82	--
1-7a (c)	Station Ventilation Louvre	87	--
1-7b (c)	Station Ventilation Louvre	87	--
2-1a (c)	Station Ventilation Louvre	83	--
2-1b	Tunnel Ventilation Louvre	87	77
2-2a (c)	Station Ventilation Louvre	88	--
2-2b (c)	Station Ventilation Louvre	86	--
2-2c (b)	Station Ventilation Louvre	--	--
2-2d	Tunnel Ventilation Louvre	95	95
2-2e (b)	Station Ventilation Louvre	--	--
2-3a	Tunnel Ventilation Louvre	88	86
2-3b (c)	Station Ventilation Louvre	94	--
3-1a (c)	Station Ventilation Louvre	89	--
3-1b (c)	Tunnel Ventilation Louvre	89	--
3-2a	Station Ventilation Louvre	93	85
4-1a	Station Ventilation Louvre	90	82
5-1a (c)	Tunnel Ventilation Shaft	93	--

Plant Item <sup>(a)(b)</sup>	Description	Maximum Allowable SWL, dB(A)
<b>Notes:</b>		
(a)	The fixed plant will be used to support the operation of Shatin Central Link (SCL).	
(b)	These noise sources have been removed as no noise source is connected to the louvre or noise source is not belonged to KTE or SCL.	
(c)	No noise source is connected to these louvres during night-time period.	
(d)	Noise source connecting to F4a will be operated during daytime. During night-time period, noise source connecting to F4b will be operated while that for F4a will not be operated.	
(e)	Tunnel ventilation shaft H and I will not be operated concurrently as only one of them will be operated at a time.	

3.1 NOISE MEASUREMENT TO OBTAIN THE SWLS OF FIXED PLANT NOISE SOURCES

Noise measurements to obtain the SWLs of the fixed plant noise sources are undertaken by NAP Acoustics (Far East) Limited. Details of the measurement methodology, calibration certificates of equipment and sample photographs showing the measurement locations are shown in Annexes A2 to A4, respectively.

3.1.1 Measurement Equipment

The sound level meters and calibrators used for noise measurements are listed in the Table 3.1. The instruments used for the noise measurements comply with International Electrotechnical Commission Publications 651:1979 (Type 1) and 804:1985 (Type 1). The calibration certificates of equipment are shown in Annex A3.

Table 3.1 Noise Measurement Equipment

Equipment	Model	Serial Number
Sound Level Meter	Norsonic Nor140	1406038
	Larson Davis 831	0002594
	Ono Sokki LA-5111	24200127
Calibrator	Brüel & Kjær 4231	2571861

Before and after each series of measurements, a sound calibrator was applied to the microphone to verify the calibration of the measuring system. The difference between the readings made before and after each series of measurements shall be less than or equal to 1.0 dB.

3.1.2 Measurement Date and Time

The noise measurements at WAB, HOM and WHA were all carried out during evening and night-time period at the fixed plant noise sources. The noise measurement schedule is shown in Table 3.2.

Table 3.2 Measurement Schedule

Location	Date
WAB	26 - 27 May 2016
	1 - 2 June 2016
	14 - 15 July 2016
	9 - 10 August 2016
HOM	24 - 25 June 2016
	14 - 16 July 2016
	19 - 19 July 2016
	26 - 27 July 2016
	8 - 10 August 2016
	12 - 13 August 2016
	19 - 24 August 2016

Location	Date
WHA	27 - 29 July 2016
	4 - 5 August 2016
	14 - 15 August 2016
	18 - 19 August 2016

### 3.2 NOISE MEASUREMENT TO CONFIRM ANY TONAL, IMPULSIVE AND INTERMITTENT CHARACTERISTICS FROM THE FIXED PLANT NOISE SOURCES AT NSRS

#### 3.2.1 Measurement Equipment

The sound level meters and calibrators used for noise measurements are listed in the *Table 3.3*. The instruments used for the noise measurements comply with International Electrotechnical Commission Publications 651:1979 (Type 1) and 804:1985 (Type 1). The calibration certificates of equipment are shown in *Annex B1*.

**Table 3.3** *Noise Measurement Equipment*

Equipment	Model	Serial Number
Sound Level Meter	01dB-Stell Solo	65226
	Svantek Svan 959	11238
	NTi XL2-TA2	A2A-08670-E0
	Casella CEL-633C	0442197
	Rion NA-27	00201194
	Brüel & Kjær 2250-L	2741137
	Brüel & Kjær 2250-L	2675655
	Svantek Svan 955	15234
	Svantek Svan 958	20890
	Svantek Svan 958	28422
Calibrator	01dB-Stell CAL21	34113607(2011)
	Svantek SV 30A	7441
	Rion NC-73	10786708
	Brüel & Kjær 4231	2309393
	Svantek SV 30A	29088
	Svantek SV 30A	7971

Before and after each series of measurements, a sound calibrator was applied to the microphone to verify the calibration of the measuring system. The difference between the readings made before and after each series of measurements shall be less than or equal to 1.0 dB.

#### 3.2.2 Measurement Parameters

The noise measurements were conducted in terms of the A-weighted equivalent continuous sound pressure level over 30 minutes,  $L_{Aeq} (30 \text{ min})$ , in one-third octave band, for two scenarios:



- *Scenario 1* - full capacity of normal operation mode with emergency mode to check against noise criteria during daytime and evening periods
- *Scenario 2* - full capacity of normal operation mode without emergency mode to check against the noise criteria during night-time period.

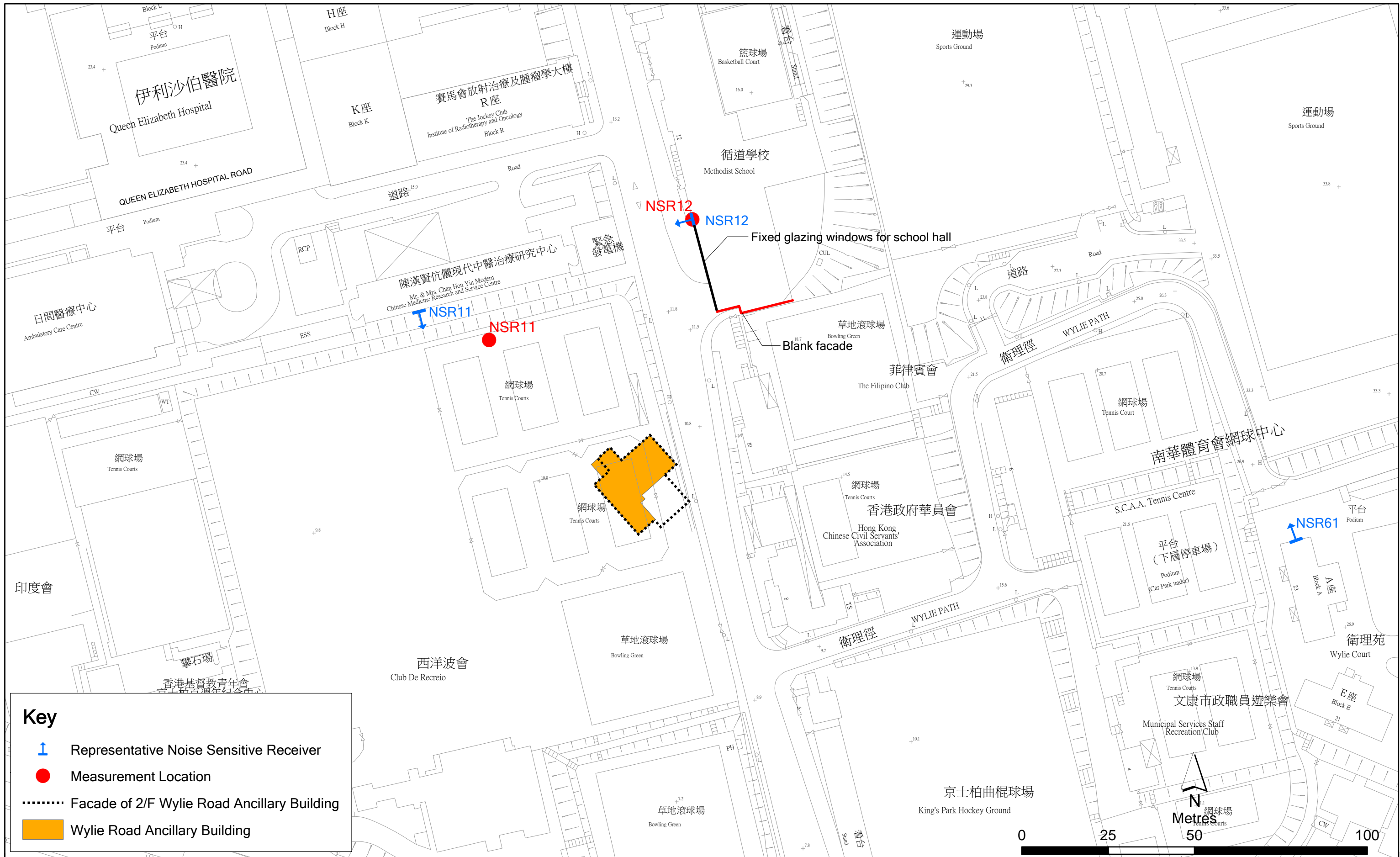
2 sets of background noise level,  $L_{Aeq(5\text{ min})}$ , in one-third octave band, were measured at each measurement location when all fixed plant equipment were shut down without abnormal intrusive noise.

### 3.2.3 *Measurement Location*

Fixed plant noise measurements were carried out at the first layer of NSRs from WAB, HOM and WHA. The measurement locations were selected with direct line of sight to the noise sources and hence considered sufficient to be representative. The measurement locations are summarised in *Table 3.4* and shown in *Figures 3.1, 3.2* and *3.3*. Photographs of measurement locations are shown in *Annex B2*.

**Table 3.4** *Noise Measurement Locations*

Works Area	NSR ID	Description	Type	Measurement Height
WAB	NSR 11	Yau Ma Tei Specialist Clinic	Hospital	~5m above ground level at tennis court in front of the clinic
	NSR 12	Methodist School	Educational Institution	~5m above ground level
HOM	NSR 18	Yee Fu Building	Residential	~10m above ground level
	NSR 20	Chinachem (Hung Hom) Commercial Centre	Residential	~1.2m above footbridge
	NSR 40b	Residential Building, Ho Man Tin Station Development (Planned Future NSR)	Residential	~10m above ground level
	NSR 40c	Residential Building, Ho Man Tin Station Development (Planned Future NSR)	Residential	~5m above ground level
	NSR 40d	Residential Building, Ho Man Tin Station Development (Planned Future NSR)	Residential	~5m above ground level
	NSR 45	271 Chatham Road North	Residential	~5m above ground level
WHA	NSR 27a	Block Y, Ki Fu Building, Whampoa Estate	Residential	~5m above ground level
	NSR 28	Block H, On Wah Building, Whampoa Estate	Residential	~5m above ground level
	NSR 29a	Block 9, Bauhinia Mansions, Whampoa Garden Site 11	Residential	~5m above ground level
	NSR 31a	Block 5, Cherry Mansions, Whampoa Garden Site 2	Residential	~3m above podium



**Key**





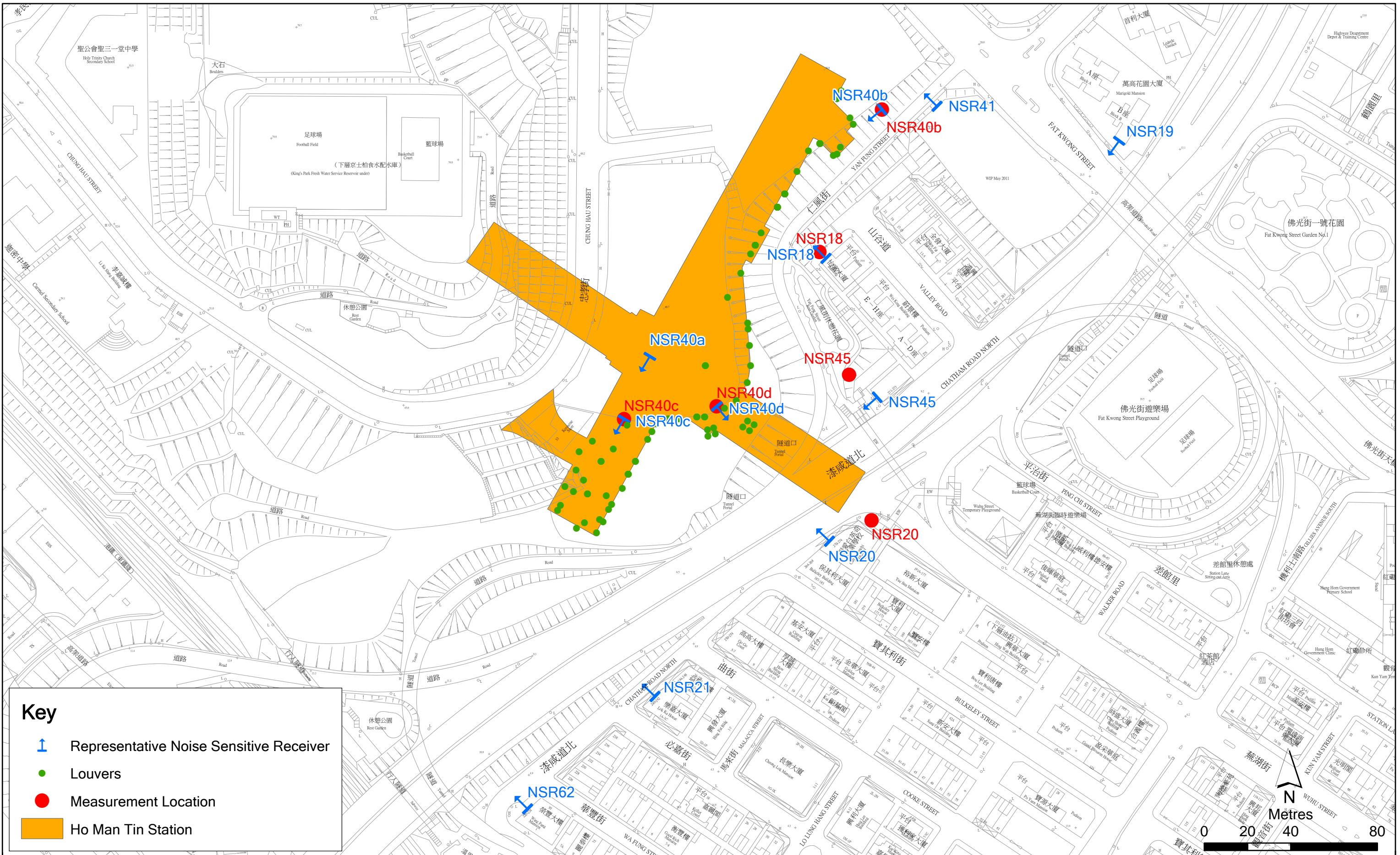
-  Representative Noise Sensitive Receiver
-  Measurement Location
-  Facade of 2/F Wylie Road Ancillary Building
-  Wylie Road Ancillary Building

Figure 3.1  
**Fixed Plant Noise Measurement Locations at WAB**

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 Date: 22/7/2016





**Key**






-  Representative Noise Sensitive Receiver
-  Louvers
-  Measurement Location
-  Ho Man Tin Station

Figure 3.2

Fixed Plant Noise Measurement Locations at HOM

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Date: 26/8/2016

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Works Area	NSR ID	Description	Type	Measurement Height
	NSR 32	Block 13, Bauhinia Mansions, Whampoa Garden Site 11	Residential	~3m above podium
	NSR 34b	Fung Kei Millennium Primary School	Educational Institution	2/F, ~1.2m above floor
	NSR 47	Block 7, Bauhinia Mansions, Whampoa Garden Site 11	Residential	~5m above ground level
	NSR 48a	Block I, Lok Wah Building, Whampoa Estate	Residential	~5m above ground level
	NSR 50	Block 2, Oak Mansions, Whampoa Garden Site 5	Residential	~1.2m above podium
	NSR 51a	Block 5, Cotton Tree Mansions Whampoa Garden Site 7	Residential	~3m above podium

### 3.2.4 *Measurement Date and Time*

The noise measurements were carried out for *Scenario 1* and *Scenario 2* at the monitoring locations of WAB, WHA and HOM. The measurement schedule is presented in *Table 3.5*.

**Table 3.5** *Measurement Schedule*

Location	Date
WAB	15 - 16 August 2016
HOM	23 August 2016
WHA	26 August 2016

## 4.1 NOISE MEASUREMENT TO OBTAIN THE SWLS OF FIXED PLANT NOISE SOURCES

The measured SWLs of worst case scenario during daytime and evening, and night-time periods are presented in *Table 4.1*. Details of the measurement results are shown in *Annex A5*.

**Table 4.1** Summary of Measured SWLs for Fixed Plants

Works Area	Plant Item	Measured SWL, dB(A) <sup>(a)</sup>		Maximum allowable SWL, dB(A) <sup>(b)</sup>		Compliance (Y/N)	
		Daytime	Night-time	Daytime	Night-time	Daytime	Night-time
WAB	VSWAB-1A	67	67	88	83	Y	Y
	VSWAB-1B	96	--	96	--	Y	--
	VSWAB-2	89	78	95	85	Y	Y
	VSWAB-3	93	--	95	--	Y	--
	VSWAB-4	84	84	95	93	Y	Y
	VSWAB-5A	81	81	93	83	Y	Y
	VSWAB-5B	81	81	93	83	Y	Y
	VSWAB-6A	78	78	94	84	Y	Y
	VSWAB-6B	78	78	94	84	Y	Y
	VSWAB-7A	83	83	95	93	Y	Y
	VSWAB-7B	84	84	95	93	Y	Y
VSWAB-10	79	79	94	92	Y	Y	
HOM	A1	93	83	93	83	Y	Y
	A2	93	83	93	83	Y	Y
	A3	88	78	88	78	Y	Y
	A4	88	78	88	78	Y	Y
	A5	88	78	88	78	Y	Y
	A6	86	76	86	76	Y	Y
	B1	94	84	94	84	Y	Y
	B2	94	84	94	84	Y	Y
	B3a	82	82	93	86	Y	Y
	B3b	82	70	93	86	Y	Y
	B4	96	--	98	--	Y	--
	B4a	81	81	91	82	Y	Y
	B5	82	82	92	83	Y	Y
	B6	86	--	95	--	Y	--
	B7	85	--	95	--	Y	--
	B8	85	--	90	--	Y	--
	B9	72	72	95	85	Y	Y
	B10	69	--	82	--	Y	--
	B11	68	--	85	--	Y	--
	C1a	77	77	90	80	Y	Y
	C1b	80	80	94	81	Y	Y
C2a	80	80	90	80	Y	Y	
C2b	82	82	92	82	Y	Y	
C2c	76	--	78	--	Y	--	
C2d	83	83	92	83	Y	Y	
C2e	83	83	92	83	Y	Y	
C3	81	81	91	86	Y	Y	

Works Area	Plant Item	Measured SWL, dB(A) <sup>(a)</sup>		Maximum allowable SWL, dB(A) <sup>(b)</sup>		Compliance (Y/N)	
	C4	80	80	93	81	Y	Y
	C4a	86	86	93	89	Y	Y
	C5	80	80	93	84	Y	Y
	C6	83	78	94	80	Y	Y
	C7a	--	--	--	--	--	--
	C7b	--	--	--	--	--	--
	C7c	78	--	85	--	Y	--
	C7d	--	--	--	--	--	--
	D1	89	89	92	90	Y	Y
	D2	87	87	88	88	Y	Y
	D3	85	84	95	85	Y	Y
	D4	--	--	--	--	--	--
	D5	83	83	93	83	Y	Y
	D6	85	85	94	86	Y	Y
	D7	82	82	93	83	Y	Y
	D8	79	--	91	--	Y	--
	D9	77	77	86	78	Y	Y
	D10	80	77	84	78	Y	Y
	D11	77	77	85	78	Y	Y
	E1	76	76	88	80	Y	Y
	E2	74	74	87	78	Y	Y
	E3	76	76	86	79	Y	Y
	E4	76	76	85	77	Y	Y
	E5-1	76	76	88	82	Y	Y
	E5-2	--	--	--	--	--	--
	E5-3	80	70	80	70	Y	Y
	F1	80	73	85	75	Y	Y
	F1a	68	68	84	74	Y	Y
	F1b	66	66	84	81	Y	Y
	F1c	68	68	80	75	Y	Y
	F1d	73	--	82	--	Y	--
	F1e	--	--	--	--	--	--
	F2	85	75	85	75	Y	Y
	F3a	69	69	87	77	Y	Y
	F3b	70	70	86	76	Y	Y
	F3c	--	--	--	--	--	--
	F3d	68	68	86	76	Y	Y
	F3e	--	--	--	--	--	--
	F4a	80	--	87	--	Y	--
	F4b	--	69	--	70	--	Y
	G1	87	77	87	77	Y	Y
	G2	87	77	87	77	Y	Y
	G3	81	71	81	71	Y	Y
	G4	78	68	78	68	Y	Y
	G5	78	68	78	68	Y	Y
	H1	91	--	92	--	Y	--
	H2	91	--	92	--	Y	--
	H3	91	--	91	--	Y	--
	H4	88	--	90	--	Y	--
	I1	92	--	97	--	Y	--
	I2	91	--	97	--	Y	--

Works Area	Plant Item	Measured SWL, dB(A) <sup>(a)</sup>		Maximum allowable SWL, dB(A) <sup>(b)</sup>		Compliance (Y/N)	
	I3	89	--	91	--	Y	--
	I4	90	--	91	--	Y	--
	J1	--	--	--	--	--	--
	J2	--	--	--	--	--	--
	J3	75	75	86	76	Y	Y
	J4	75	75	83	76	Y	Y
	J5	74	74	83	75	Y	Y
	J6	74	74	86	76	Y	Y
	J7	--	--	--	--	--	--
	K1a	--	--	--	--	--	--
	K1b	84	84	89	86	Y	Y
	K2	--	--	--	--	--	--
	K3	79	--	91	--	Y	--
	K4	75	--	90	--	Y	--
	K5	74	--	94	--	Y	--
	K6	76	--	95	--	Y	--
WHA	1-1a	85	--	94	--	Y	--
	1-2a	86	--	90	--	Y	--
	1-2b	78	78	86	84	Y	Y
	1-3a	76	--	81	--	Y	--
	1-3b	68	68	81	74	Y	Y
	1-3c	74	74	85	75	Y	Y
	1-3d	72	72	85	78	Y	Y
	1-4a	83	--	90	--	Y	--
	1-6c	72	72	83	77	Y	Y
	1-6a	70	--	82	--	Y	--
	1-7a	66	--	87	--	Y	--
	1-7b	71	--	87	--	Y	--
	2-1a	74	--	83	--	Y	--
	2-1b	77	77	87	77	Y	Y
	2-2a	77	--	88	--	Y	--
	2-2b	71	--	86	--	Y	--
	2-2c	--	--	--	--	--	--
	2-2d	75	75	95	95	Y	Y
	2-2e	--	--	--	--	--	--
	2-3a	77	77	88	86	Y	Y
	2-3b	82	--	94	--	Y	--
	3-1a	82	--	89	--	Y	--
	3-1b	85	--	89	--	Y	--
	3-2a	84	84	93	85	Y	Y
	4-1a	80	80	90	82	Y	Y
	5-1a	70	--	93	--	Y	--

**Notes:**

(a) Measured SWL for daytime and night-time are based on Scenario 1 and Scenario 2 stated in Section 3.2.2 respectively.

(b) The maximum allowable SWLs are given in *Table 2.1*.



**NOISE MEASUREMENT TO CONFIRM TONAL, IMPULSIVE AND INTERMITTENT CHARACTERISTICS OF FIXED PLANT NOISE SOURCES AT NSRS**

The measured noise levels for 2 Scenarios, ie during daytime and evening, and night-time periods are summarised in *Table 4.2*. In each scenario, two sets of noise measurements,  $L_{Aeq(30\text{ min})}$ , in one-third octave band, were carried out due to the difference in the measured noise levels with and without operation of fixed plant noise sources were less than 3.0 dB(A). Noise measurements at WAB, HOM and WHA were dominated by the community noise and road traffic noise along Wylie Road, Chatham Road North and Hung Hom Road/Tak On Street, respectively. Detailed results of noise measurements are presented in *Annex B3*.

**Table 4.2 Noise Measurement Results at NSRs**

Works Area	NSR ID	Scenario	Measured Noise Level	Averaged	Difference between Measured Noise Level and Background Level, dB(A) (< 3 or >= 3)	
			$L_{Aeq(30\text{ min})}$ , dB(A), (measurement time) <sup>(a)</sup>	Background Level $L_{Aeq(5\text{ min})}$ , dB(A), (measurement time) <sup>(a)</sup>		
WAB	NSR 11	1	60.0 (21:47 - 22:17)	58.9 (21:39 - 23:59)	< 3	
			60.0 (22:17 - 22:47)	58.9	< 3	
		2	57.7 (00:34 - 01:04)	57.4 (23:55 - 01:47)	< 3	
			57.5 (01:05 - 01:35)	57.4	< 3	
	NSR 12	1	68.8 (20:01 - 20:31)	70.1 (19:50 - 21:18)	< 3	
			69.4 (20:36 - 21:06)	70.1	< 3	
		2	64.6 (02:12 - 02:42)	62.8 (02:04 - 03:26)	< 3	
			63.5 (02:43 - 03:13)	62.8	< 3	
	HOM	NSR 18	1	58.2 (02:13 - 02:43)	58.4 (01:14 - 01:29)	< 3
				57.8 (02:43 - 03:13)	58.4	< 3
			2	57.4 (03:41 - 04:11)	57.1 (05:01 - 05:16)	< 3
				57.0 (04:11 - 04:41)	57.1	< 3
NSR 20		1	76.7 (02:18 - 02:48)	78.5 (00:37 - 00:55)	< 3	
			76.5 (02:48 - 03:18)	78.5	< 3	
		2	76.4 (03:44 - 04:14)	76.4 (05:03 - 05:19)	< 3	
			75.8 (04:14 - 04:44)	76.4	< 3	
NSR 40b		1	56.9 (02:15 - 02:45)	56.5 (01:05 - 01:20)	< 3	
			56.8 (02:45 - 03:15)	56.5	< 3	
		2	55.9 (03:45 - 04:15)	56.5 (05:05 - 05:20)	< 3	
			56.8 (04:15 - 04:45)	56.5	< 3	
NSR 40c		1	65.9 (02:15 - 02:45)	66.5 (01:15 - 01:30)	< 3	
			65.5 (02:45 - 03:15)	66.5	< 3	
		2	65.7 (03:41 - 04:11)	65.3 (05:02 - 05:17)	< 3	
			65.0 (04:11 - 04:41)	65.3	< 3	
NSR 40d	1	66.6 (02:14 - 02:44)	67.3 (00:48 - 01:04)	< 3		
		66.2 (02:46 - 03:16)	67.3	< 3		
	2	65.4 (03:42 - 04:12)	65.4 (05:03 - 05:18)	< 3		

Works Area	NSR ID	Scenario	Measured Noise Level L <sub>Aeq(30min)</sub> , dB(A), (measurement time) <sup>(a)</sup>	Averaged Background Level L <sub>Aeq(5min)</sub> , dB(A), (measurement time) <sup>(a)</sup>	Difference between Measured Noise Level and Background Level, dB(A) ( $< 3$ or $\geq 3$ )
			64.7 (04:12 - 04:42)	65.4	< 3
	NSR 45	1	63.0 (02:14 - 02:44)	64.8 (00:35 - 00:53)	< 3
			62.7 (02:44 - 03:14)	64.8	< 3
		2	63.1 (03:42 - 04:12)	62.0 (04:44 - 05:13)	< 3
			62.0 (04:13 - 04:43)	62.0	< 3
WHA	NSR 27a	1	61.5 (02:43 - 03:13)	61.3 (01:35 - 05:45)	< 3
			61.4 (03:18 - 03:48)	61.3	< 3
		2	60.0 (04:30 - 05:00)	66.6 (05:45 - 06:00)	< 3
			65.4 (05:08 - 05:38)	66.6	< 3
	NSR 28	1	57.5 (02:45 - 03:15)	55.3 (01:42 - 01:59)	< 3
			57.7 (03:15 - 03:45)	55.3	< 3
		2	55.6 (04:31 - 05:01)	59.8 (05:36 - 05:51)	< 3
			58.5 (05:02 - 05:32)	59.8	< 3
	NSR 29a	1	61.4 (02:43 - 03:13)	60.2 (01:55 - 05:46)	< 3
			62.0 (03:14 - 03:44)	60.2	< 3
		2	60.8 (04:29 - 04:59)	63.4 (05:46 - 06:02)	< 3
			64.7 (05:00 - 05:30)	63.4	< 3
	NSR 31a	1	58.0 (02:43 - 03:13)	60.9 (02:07 - 05:40)	< 3
			57.7 (03:14 - 03:44)	60.9	< 3
		2	58.2 (04:28 - 04:58)	60.4 (05:40 - 05:55)	< 3
			59.9 (04:58 - 05:28)	60.4	< 3
	NSR 32	1	56.1 (02:44 - 03:14)	57.6 (02:05 - 05:36)	< 3
			55.7 (03:17 - 03:47)	57.6	< 3
		2	55.6 (04:30 - 05:00)	58.5 (05:42 - 05:57)	< 3
			58.1 (05:01 - 05:31)	58.5	< 3
	NSR 34b	1	57.0 (02:45 - 03:15)	55.8 (02:20 - 02:40)	< 3
			56.8 (03:15 - 03:45)	55.8	< 3
		2	53.7 (04:30 - 05:00)	58.3 (05:40 - 05:55)	< 3
			56.6 (05:00 - 05:30)	58.3	< 3
	NSR 47	1	62.9 (02:43 - 03:13)	62.1 (01:55 - 05:46)	< 3
			63.1 (03:14 - 03:44)	62.1	< 3
		2	61.8 (04:29 - 04:59)	64.2 (05:46 - 06:02)	< 3
			65.4 (05:00 - 05:30)	64.2	< 3
	NSR 48a	1	59.9 (02:46 - 03:16)	57.2 (01:39 - 01:54)	< 3
			59.5 (03:17 - 03:47)	57.2	< 3
		2	55.6 (04:29 - 04:59)	58.9 (05:36 - 05:51)	< 3
			59.1 (05:00 - 05:30)	58.9	< 3
	NSR 50	1	56.6 (02:44 - 03:14)	58.0 (01:47 - 05:47)	< 3
			56.1 (03:15 - 03:45)	58.0	< 3
		2	56.8 (04:30 - 05:00)	60.2 (05:47 - 06:03)	< 3
			60.1 (05:00 - 05:30)	60.2	< 3

Works Area	NSR ID	Scenario	Measured Noise Level $L_{Aeq(30min)}$ , dB(A), (measurement time) <sup>(a)</sup>	Averaged Background Level $L_{Aeq(5min)}$ , dB(A), (measurement time) <sup>(a)</sup>	Difference between Measured Noise Level and Background Level, dB(A) ( $< 3$ or $\geq 3$ )
	NSR 51a	1	56.8 (02:46 - 03:16)	58.7 (01:39 - 05:38)	< 3
			56.6 (03:16 - 03:46)	58.7	< 3
		2	56.9 (04:28 - 04:58)	56.8 (05:38 - 05:54)	< 3
			57.5 (04:58 - 05:28)	56.8	< 3

**Note:**

- (a) The noise levels at the measurement locations were dominated by the traffic noise due to close proximity to the roads, noise from KTE fixed plants were not noticeable at the measurement locations, and the background noise levels were fluctuated due to the road traffic.

As the differences 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.

### 4.3

#### *FIXED PLANT NOISE AUDIT FOR SCL FIXED PLANT AT HOM*

With reference to the ERR and the Proposal for Updating SWLs, there are fixed plants in HOM to be used to support the operation of SCL. The maximum allowable SWLs of the louvres for SCL and KTE in HOM have been assessed to comply with the relevant criteria set out under the *EIAO-TM* for the NSRs as shown in *Table 2.1*. As fixed plant operation for SCL at HOM is not yet to commence, fixed plant noise audit for SCL fixed plant will be conducted before the commencement of SCL project under KTE EP condition 4.6.

## CONCLUSION

The measured sound power levels during daytime and evening, and night-time periods comply with the maximum allowable SWLs at WAB, HOM and WHA.

The differences between measured noise levels and background noise levels are less than 3.0 dB(A) at all representative NSRs. Noise measurements at WAB, HOM and WHA were dominated by the community noise and road traffic noise along Wylie Road, Chatham Road North and Hung Hom Road/Tak On Street, respectively. As the differences 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.

As fixed plant operation in HOM for SCL is not yet to commence, fixed plant noise audit for SCL fixed plant will be conducted before the commencement of SCL project under KTE EP condition 4.6.

Annex A

Noise Measurement to  
Obtain the Sound Power  
Levels of Fixed Plant Noise  
Sources (by NAP)

Annex A1





# Updated Layout and Section Plans of Fixed Plant Sources

Annex A1a

Updated Layout and  
Section Plans of Fixed Plant  
Sources (WAB)



**Key**

-  Representative Noise Sensitive Receiver
-  Louvers
-  Facade of 2/F Wylie Road Ancillary Building
-  Wylie Road Ancillary Building

Annex A1a-1

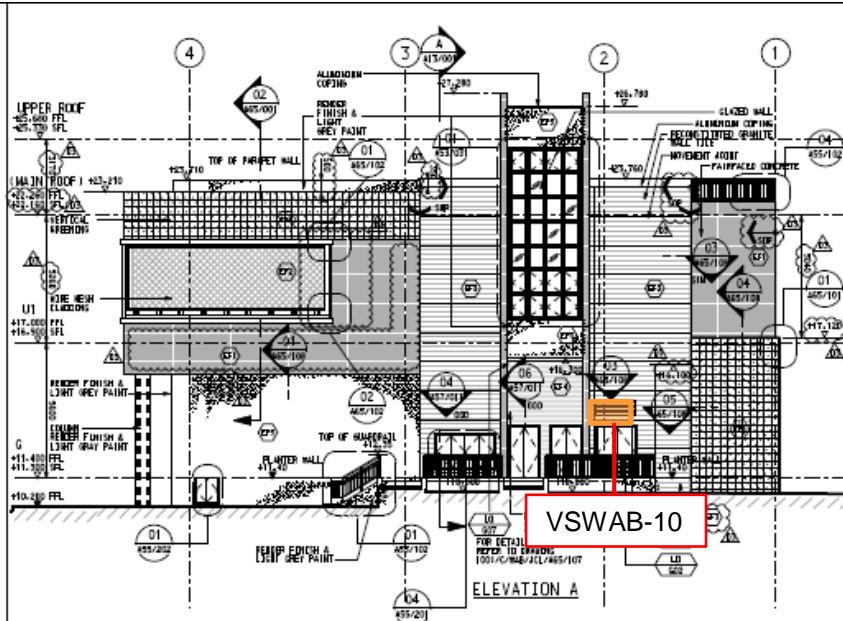
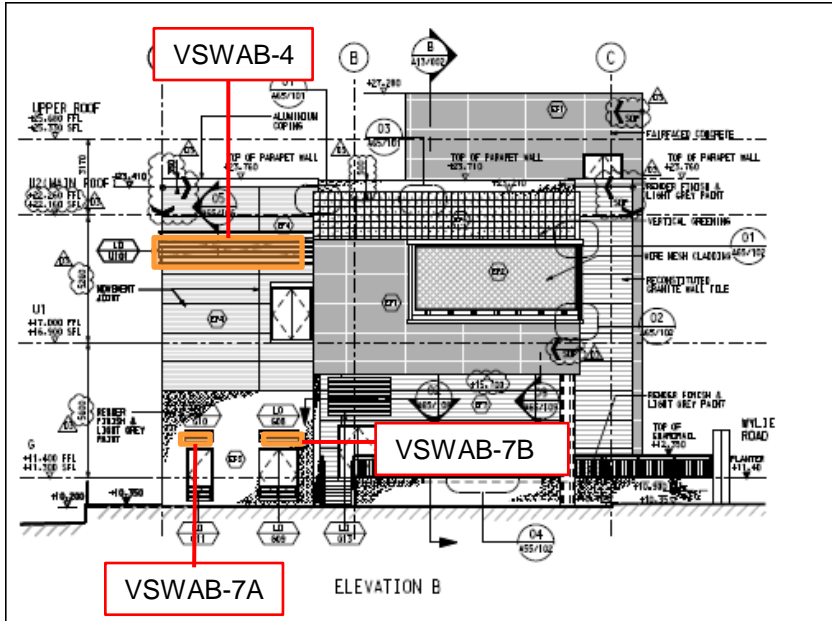
Updated Layout Plan of Louver at WAB

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 Date: 25/8/2016

**Environmental Resources Management**





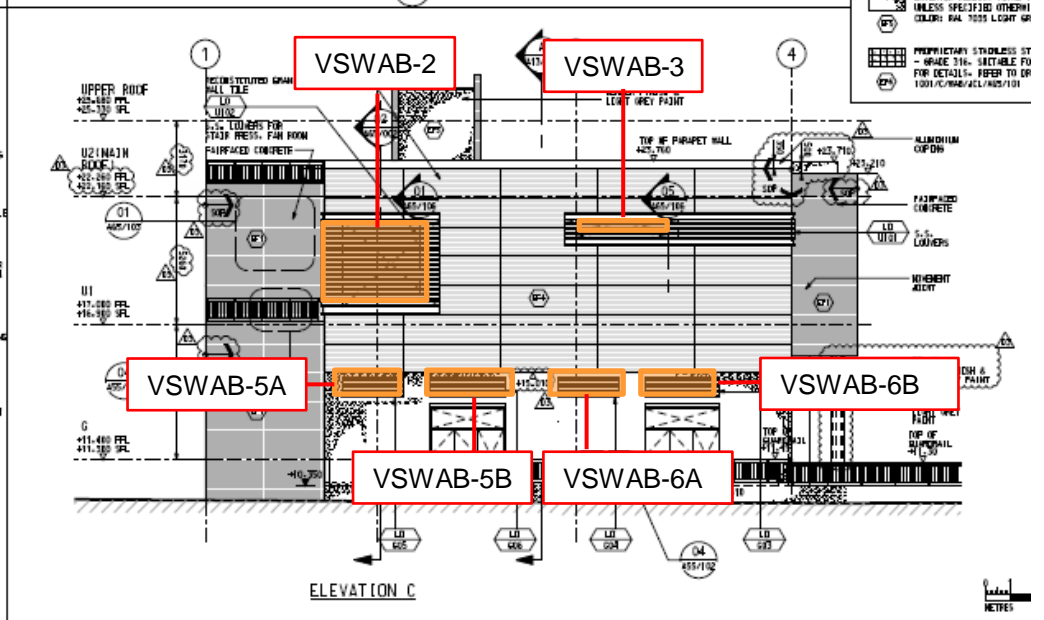
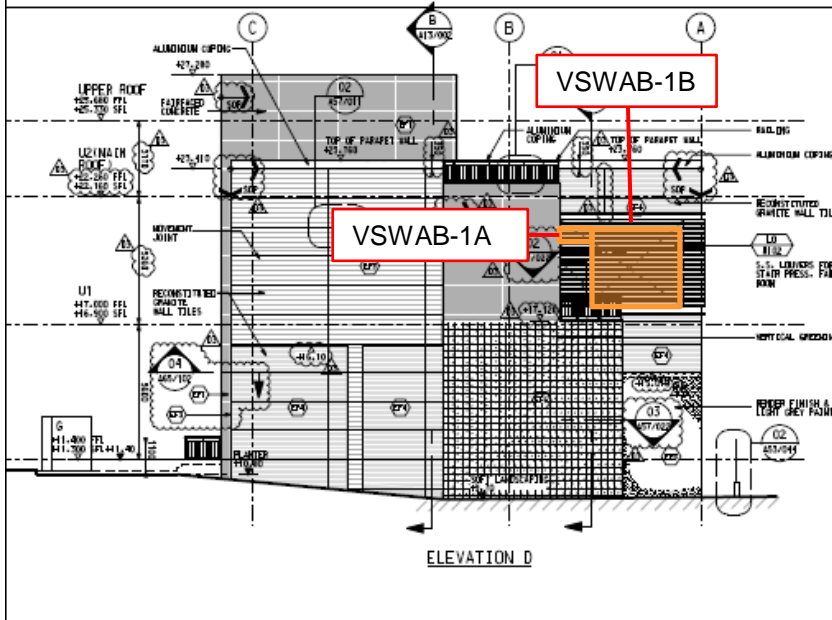



**NOTE**

- REFER TO LEGENDS & SYMBOLS ON 1001/ANB/ANP/1001/001 & 002
- ALL LAYERS SHALL BE BAL 1003 WITH PPG PRIMER COATED FINISH

**LEGEND**


- 01 - 1001/ANB/ANP/1001/001
- 02 - 1001/ANB/ANP/1001/002
- 03 - 1001/ANB/ANP/1001/003
- 04 - 1001/ANB/ANP/1001/004
- 05 - 1001/ANB/ANP/1001/005
- 06 - 1001/ANB/ANP/1001/006
- 07 - 1001/ANB/ANP/1001/007
- 08 - 1001/ANB/ANP/1001/008
- 09 - 1001/ANB/ANP/1001/009
- 10 - 1001/ANB/ANP/1001/010
- 11 - 1001/ANB/ANP/1001/011
- 12 - 1001/ANB/ANP/1001/012
- 13 - 1001/ANB/ANP/1001/013
- 14 - 1001/ANB/ANP/1001/014
- 15 - 1001/ANB/ANP/1001/015
- 16 - 1001/ANB/ANP/1001/016
- 17 - 1001/ANB/ANP/1001/017
- 18 - 1001/ANB/ANP/1001/018
- 19 - 1001/ANB/ANP/1001/019
- 20 - 1001/ANB/ANP/1001/020
- 21 - 1001/ANB/ANP/1001/021
- 22 - 1001/ANB/ANP/1001/022
- 23 - 1001/ANB/ANP/1001/023
- 24 - 1001/ANB/ANP/1001/024
- 25 - 1001/ANB/ANP/1001/025
- 26 - 1001/ANB/ANP/1001/026
- 27 - 1001/ANB/ANP/1001/027
- 28 - 1001/ANB/ANP/1001/028
- 29 - 1001/ANB/ANP/1001/029
- 30 - 1001/ANB/ANP/1001/030
- 31 - 1001/ANB/ANP/1001/031
- 32 - 1001/ANB/ANP/1001/032
- 33 - 1001/ANB/ANP/1001/033
- 34 - 1001/ANB/ANP/1001/034
- 35 - 1001/ANB/ANP/1001/035
- 36 - 1001/ANB/ANP/1001/036
- 37 - 1001/ANB/ANP/1001/037
- 38 - 1001/ANB/ANP/1001/038
- 39 - 1001/ANB/ANP/1001/039
- 40 - 1001/ANB/ANP/1001/040
- 41 - 1001/ANB/ANP/1001/041
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- 46 - 1001/ANB/ANP/1001/046
- 47 - 1001/ANB/ANP/1001/047
- 48 - 1001/ANB/ANP/1001/048
- 49 - 1001/ANB/ANP/1001/049
- 50 - 1001/ANB/ANP/1001/050



Annex A1b

Updated Layout and  
Section Plans of Fixed Plant  
Sources (HOM)

**Key**

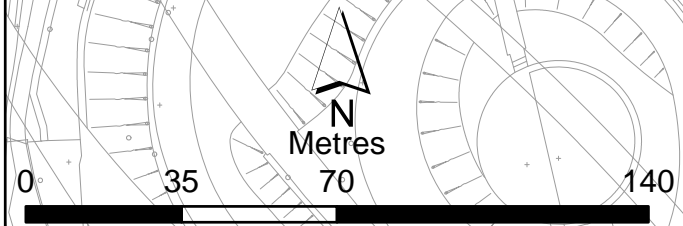
 Representative Noise Sensitive Receivers

Louvers:  
F3a, F3b, F3d, F4a, F4b,  
G1, G2, G3, G4, G5  
(See Annexes 1b-4 and 1b-5 for details)

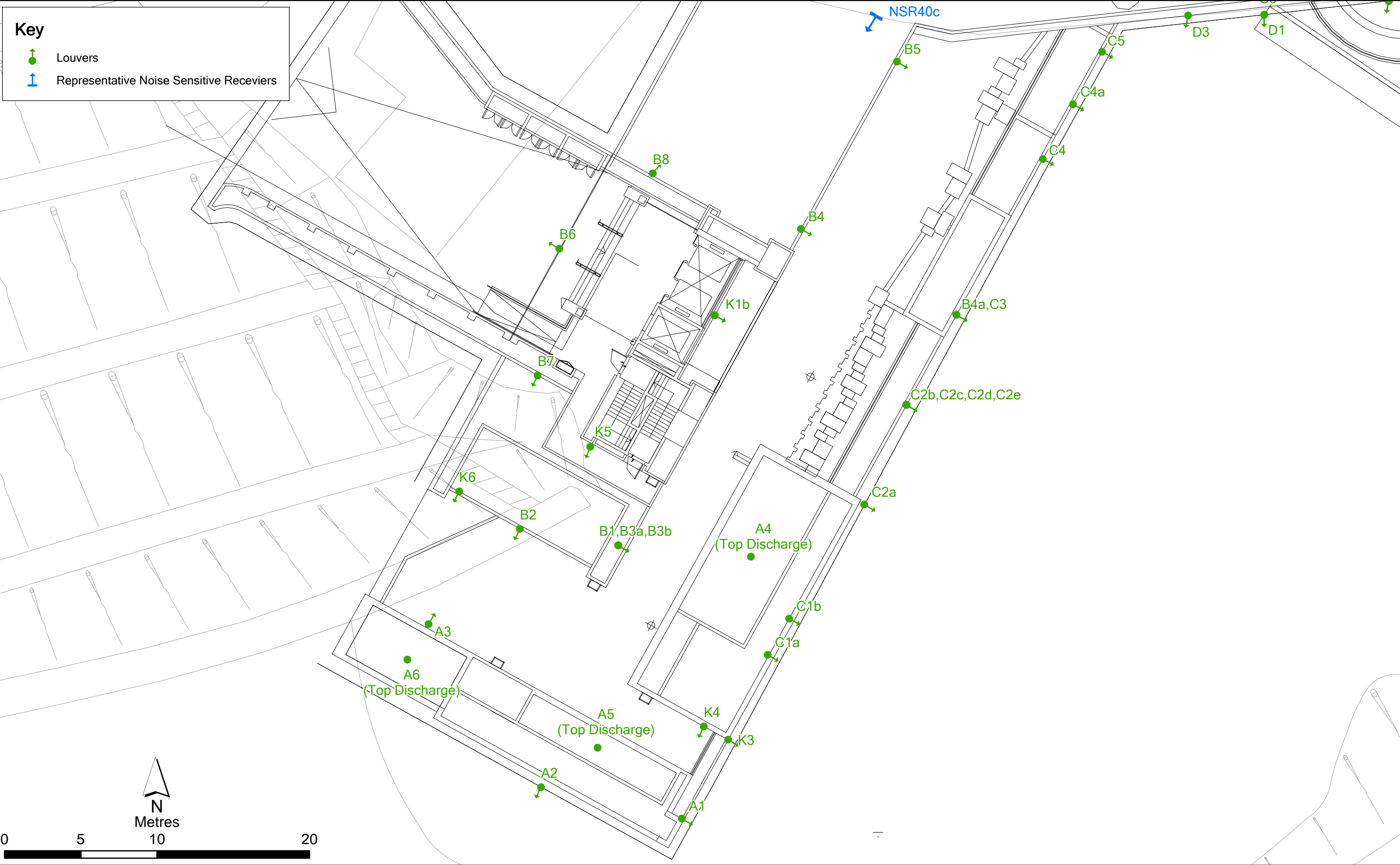
Louvers:  
E1, E2, E3, E4, E5-1, E5-3  
F1, F1a, F1b, F1c, F1d, F2  
J3, J4, J5, J6,  
(See Annex 1b-4 for details)

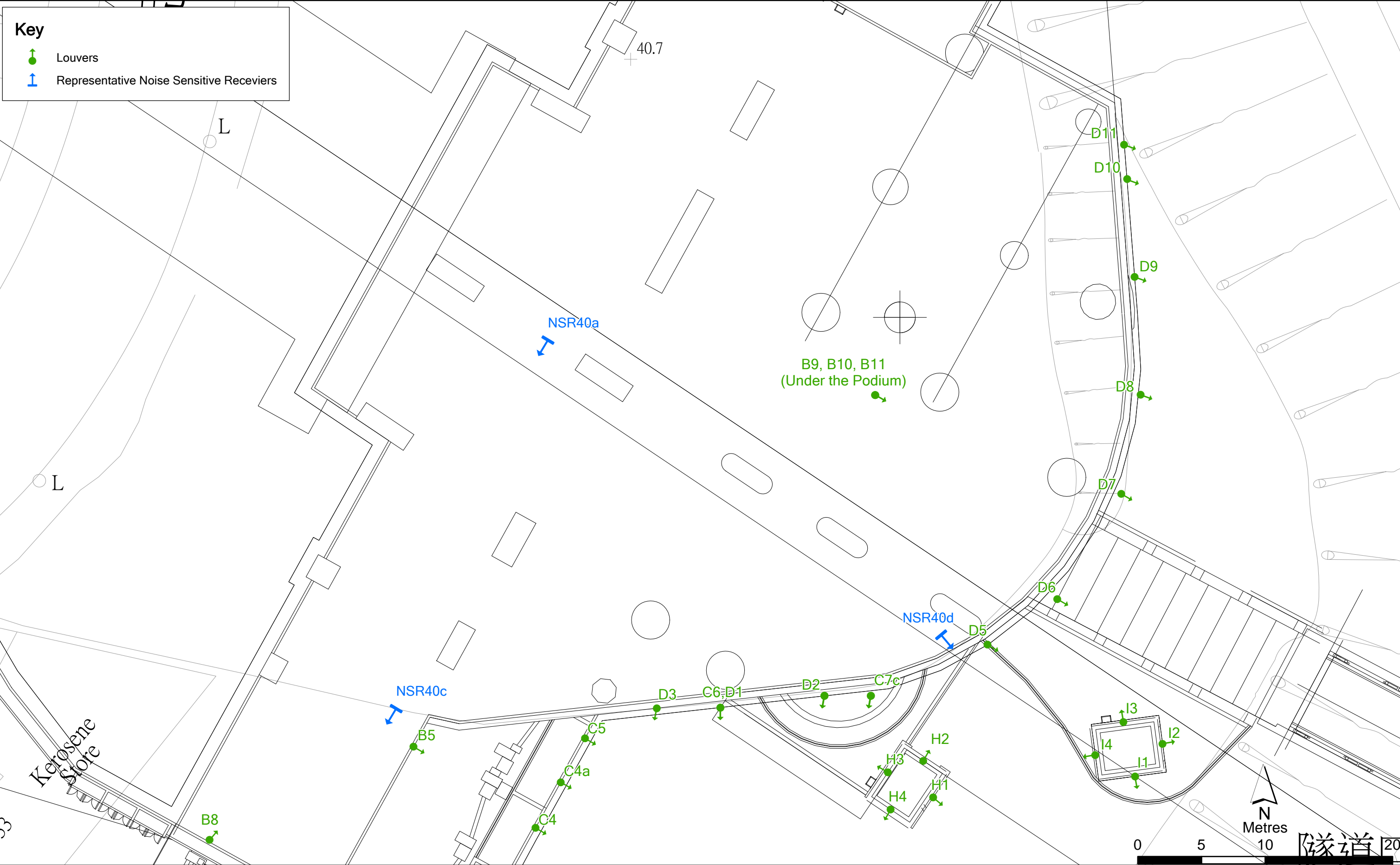
Louvers:  
B5, B8, B9, B10, B11  
C5, C6, C7c  
D1, D2,D3, D5, D6, D7, D8, D9, D10, D11  
H1, H2, H3, H4  
I1,I2,I3,I4  
(See Annexes 1b-2 and 1b-3 for details)

Louvers:  
A1, A2, A3, A4, A5, A6  
B1,B2,B3a,B3b,B4, B4a, B6, B7, B8  
C1a, C1b, C2a, C2b, C2c, C2d, C2e, C3, C4, C4a  
K1b, K3, K4, K5, K6  
(See Annex 1b-2 for details)









Annex 1b-3

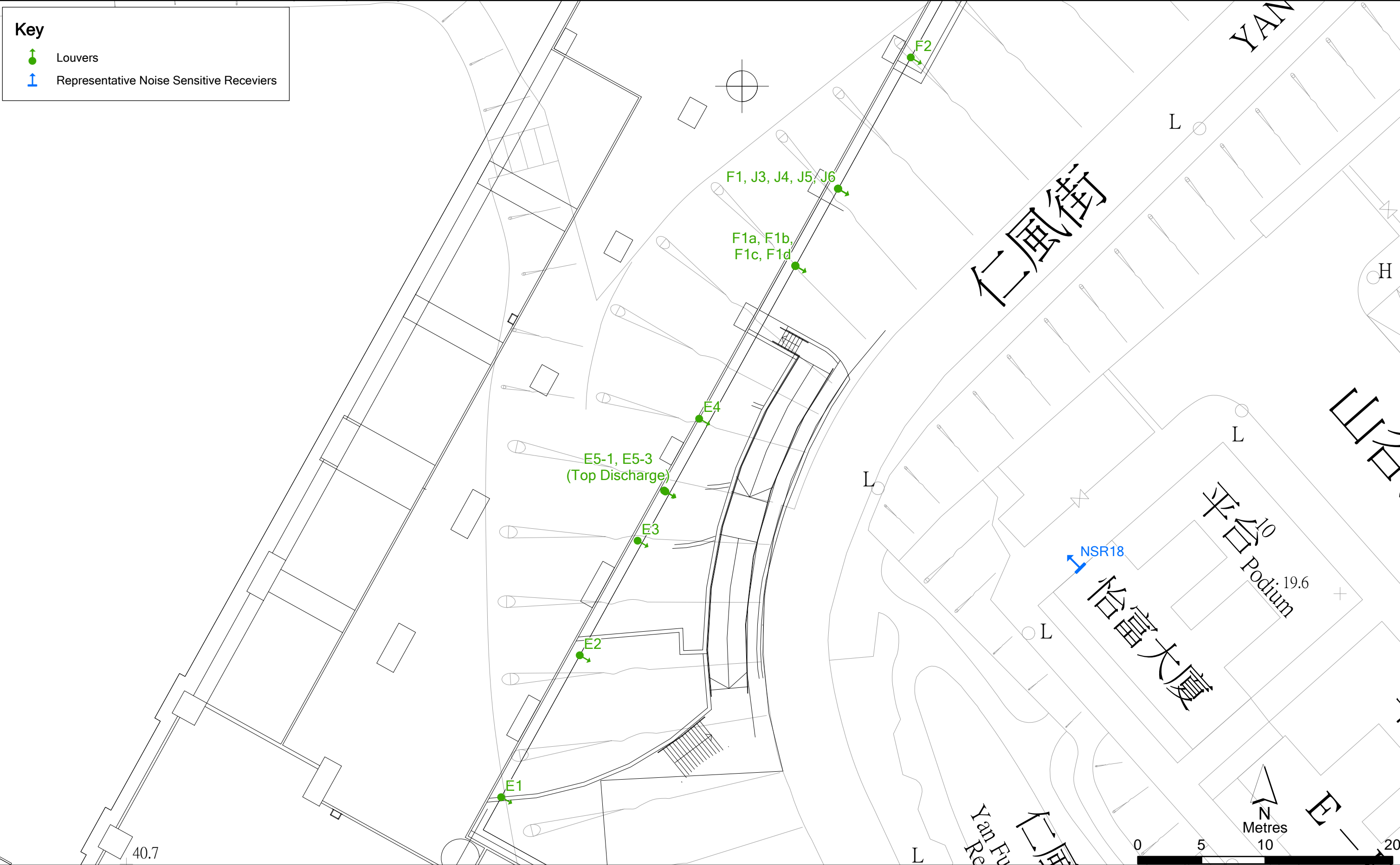
Updated Layout Plan for Louvers at HOM

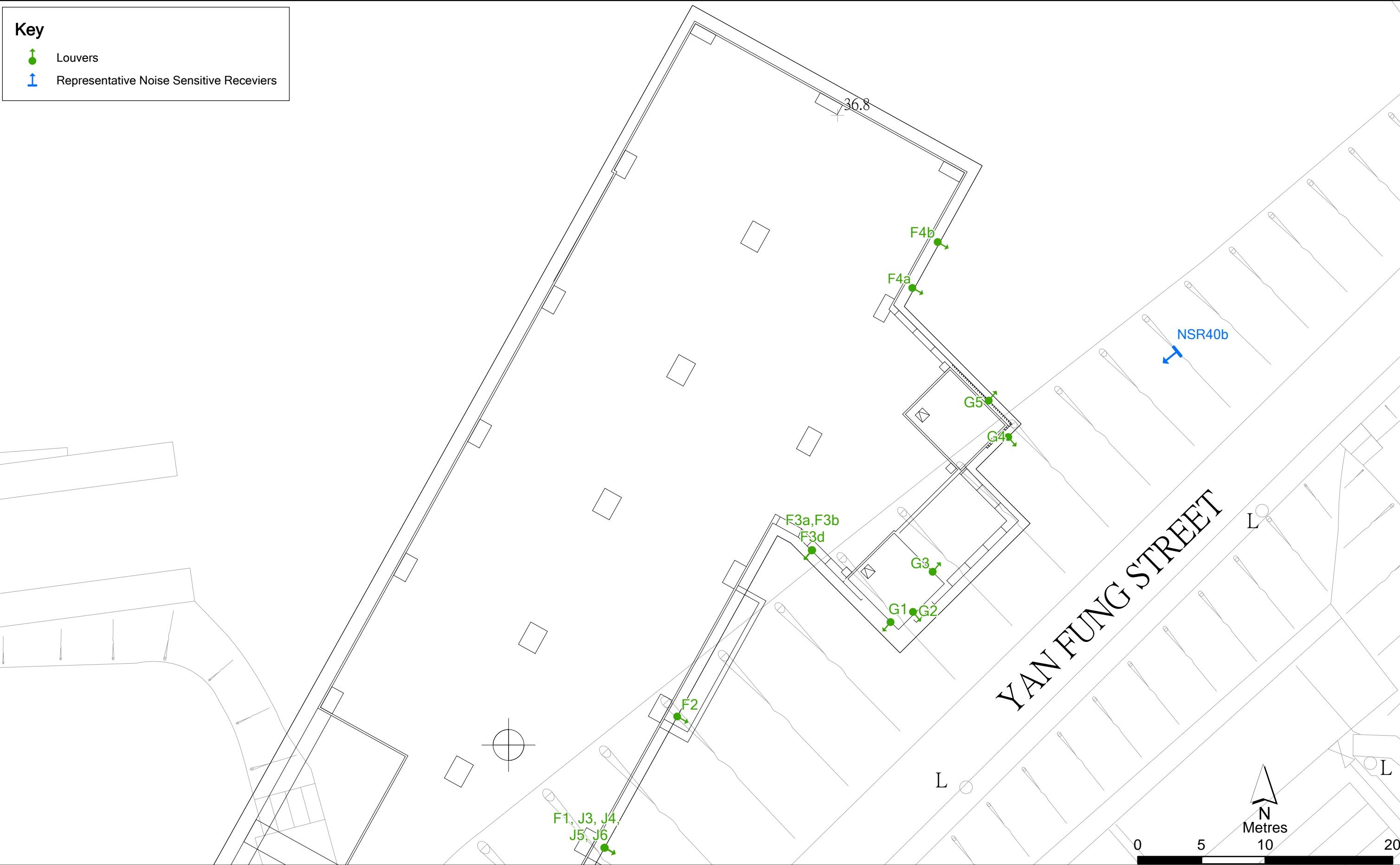
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 Date: 25/8/2016

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 Resources  
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Annex 1b-5

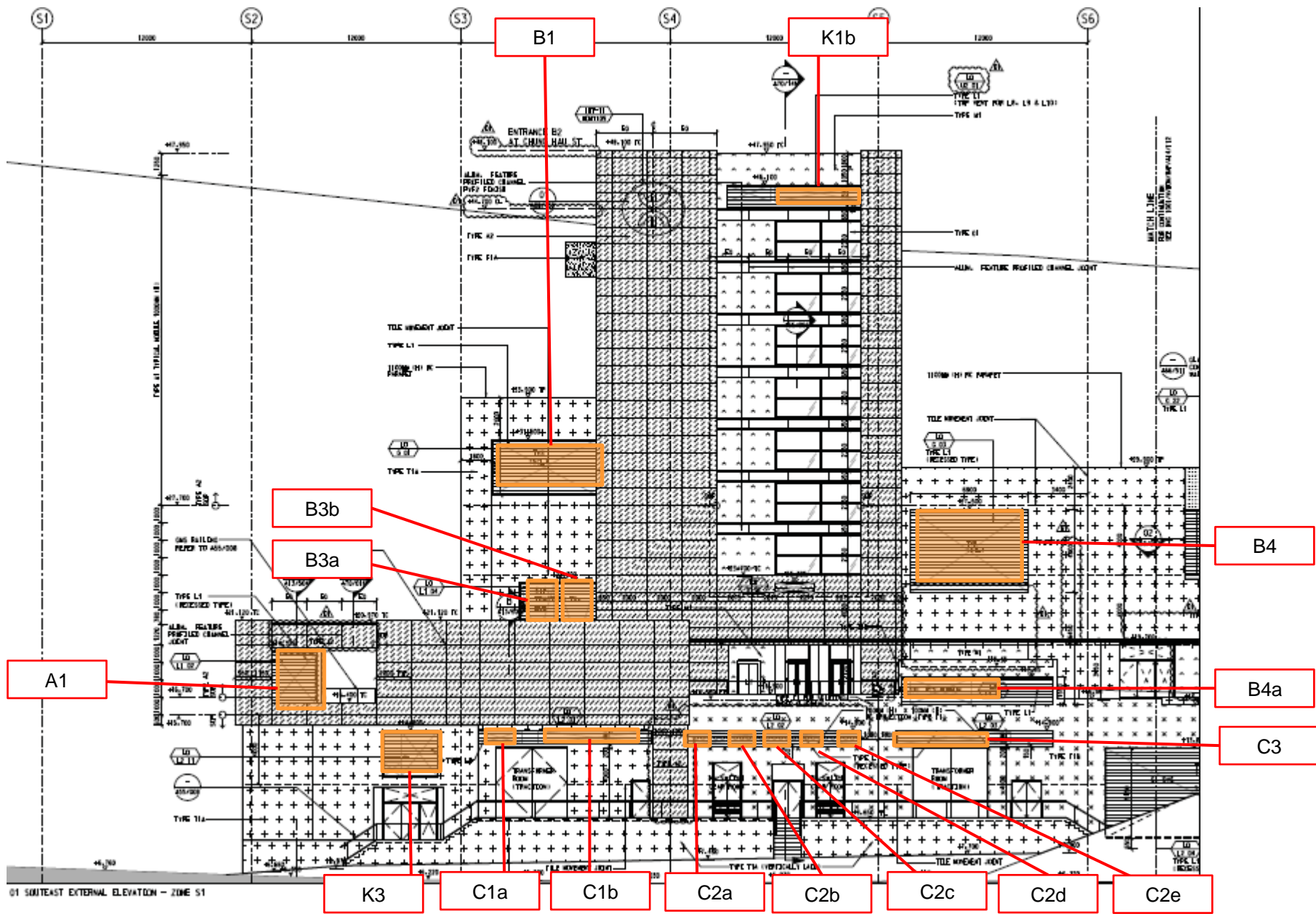
Layout Plan for Louvers at HOM

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Date: 25/8/2016

Environmental  
Resources  
Management







Annex 1b-6

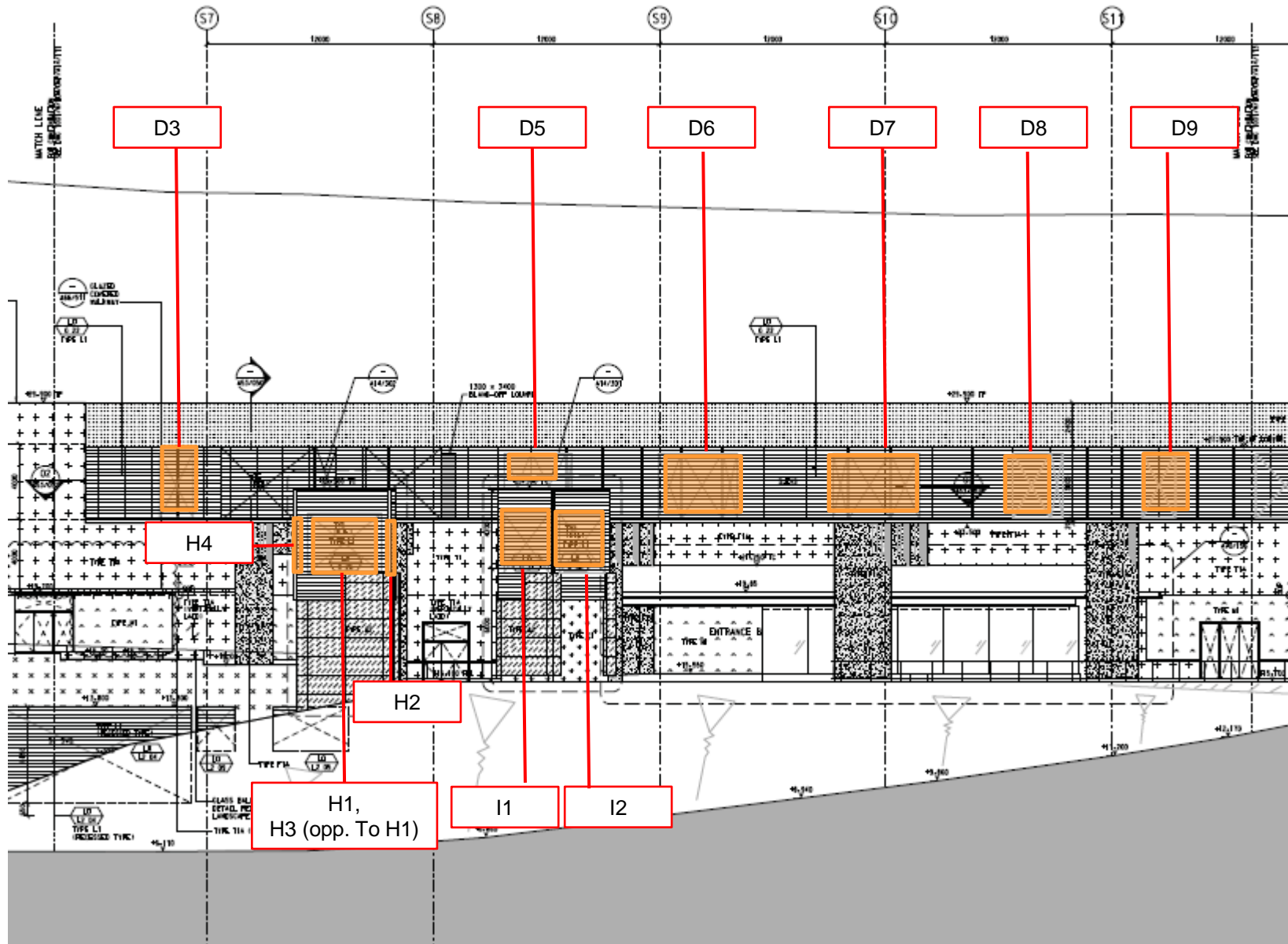
Updated Elevation and Section Plans of Fixed Plant Sources at HOM

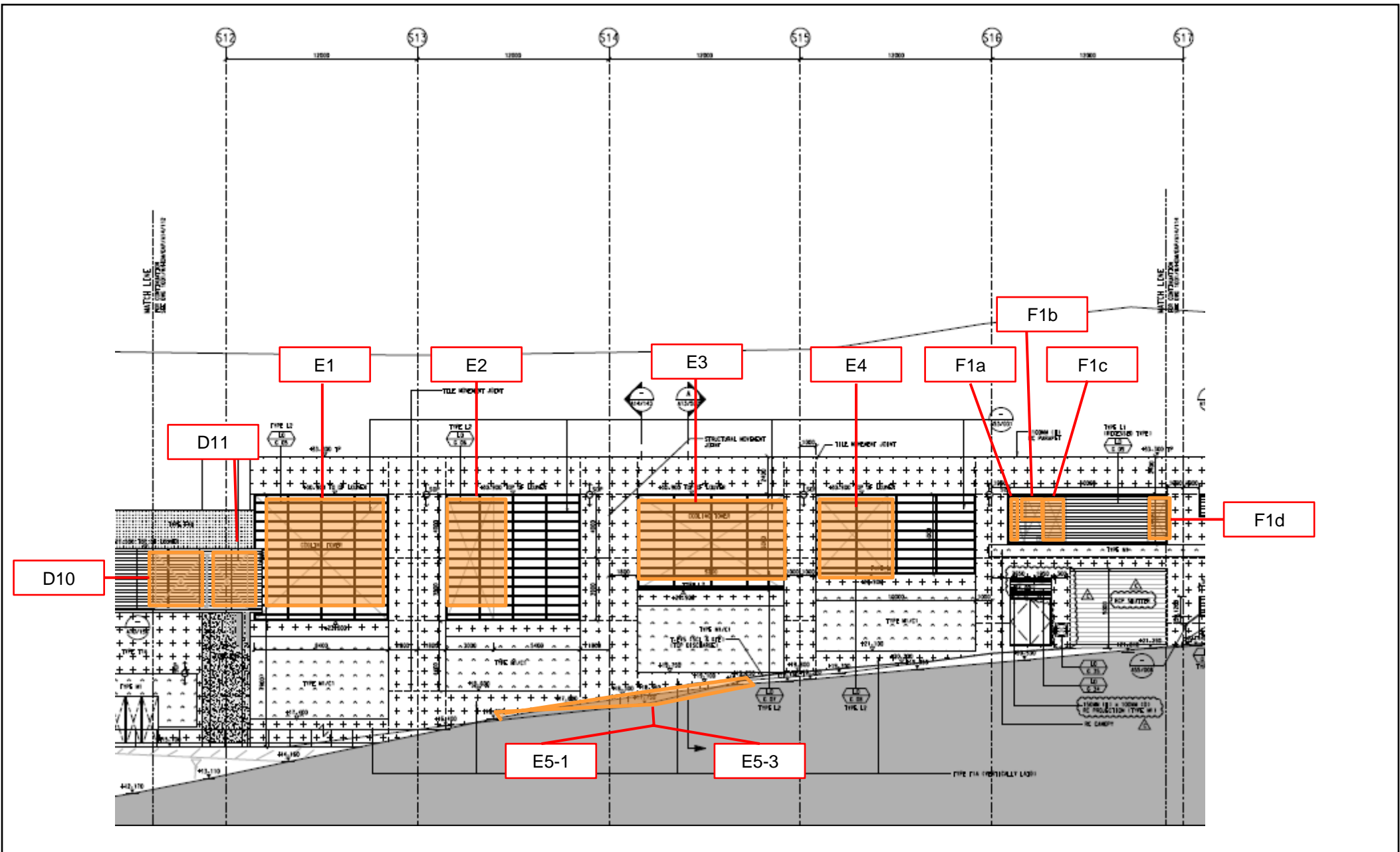
DATE: 09/08/2016

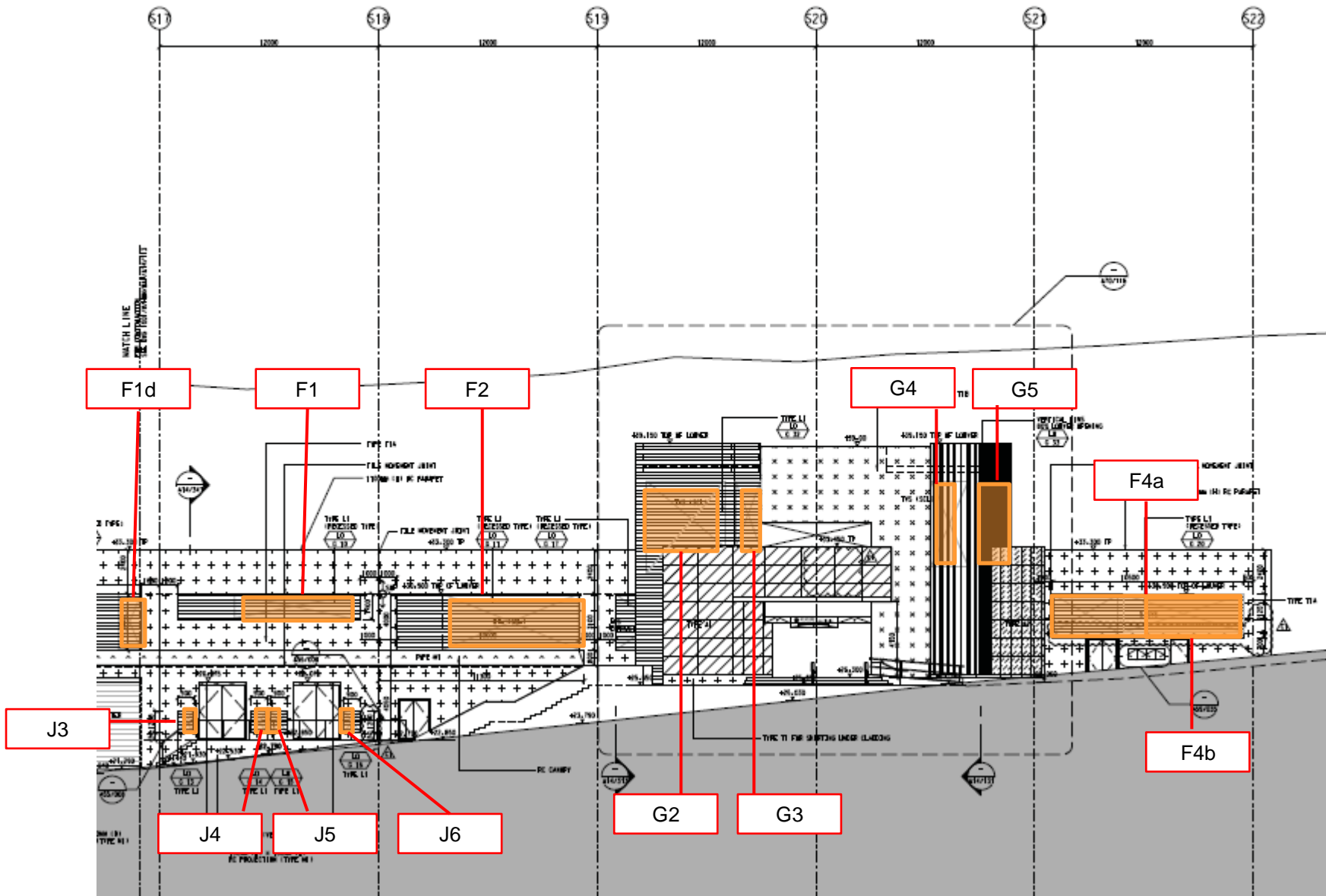
Environmental  
Resources  
Management











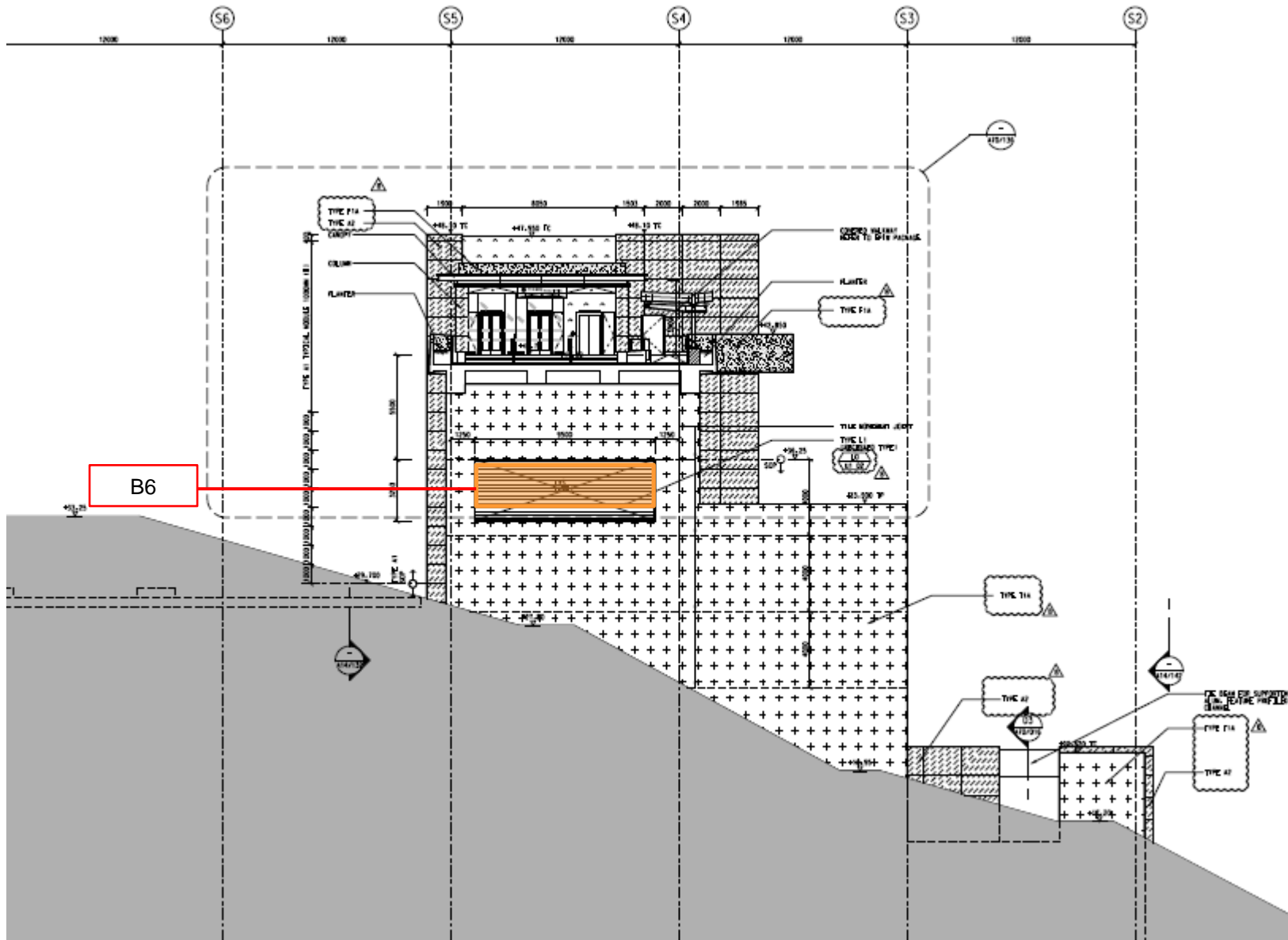
Annex 1b-9

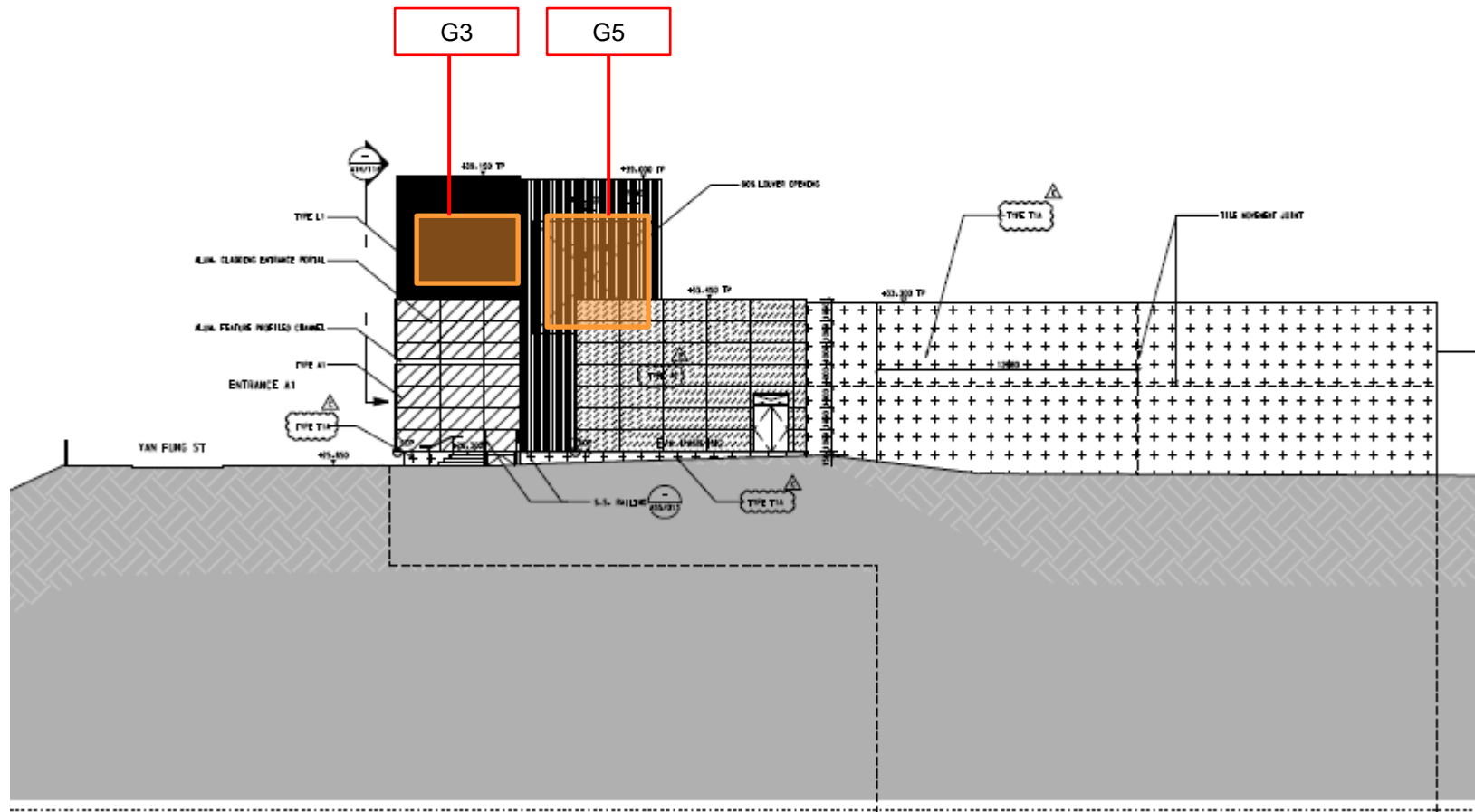
Updated Elevation and Section Plans of Fixed Plant Sources at HOM

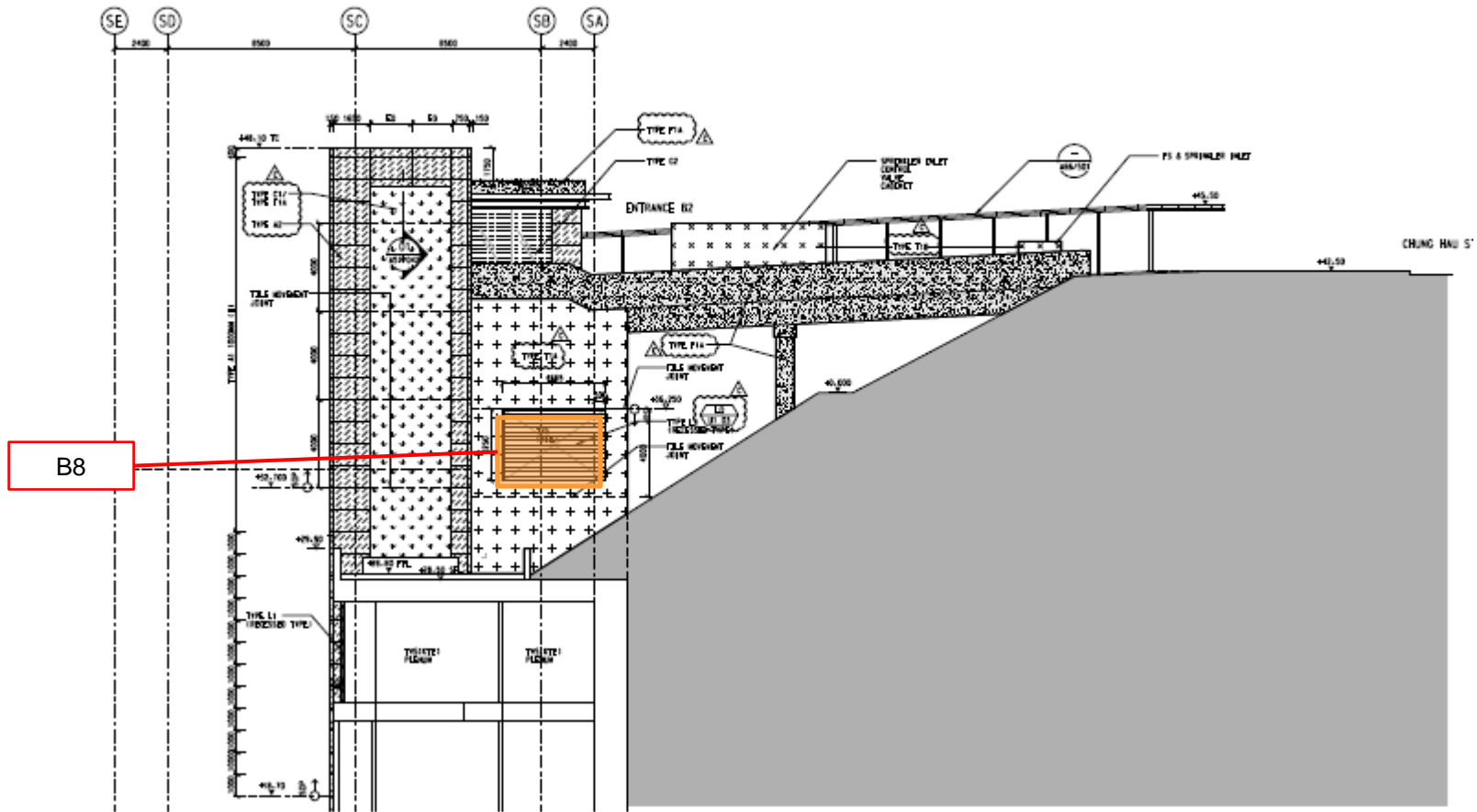
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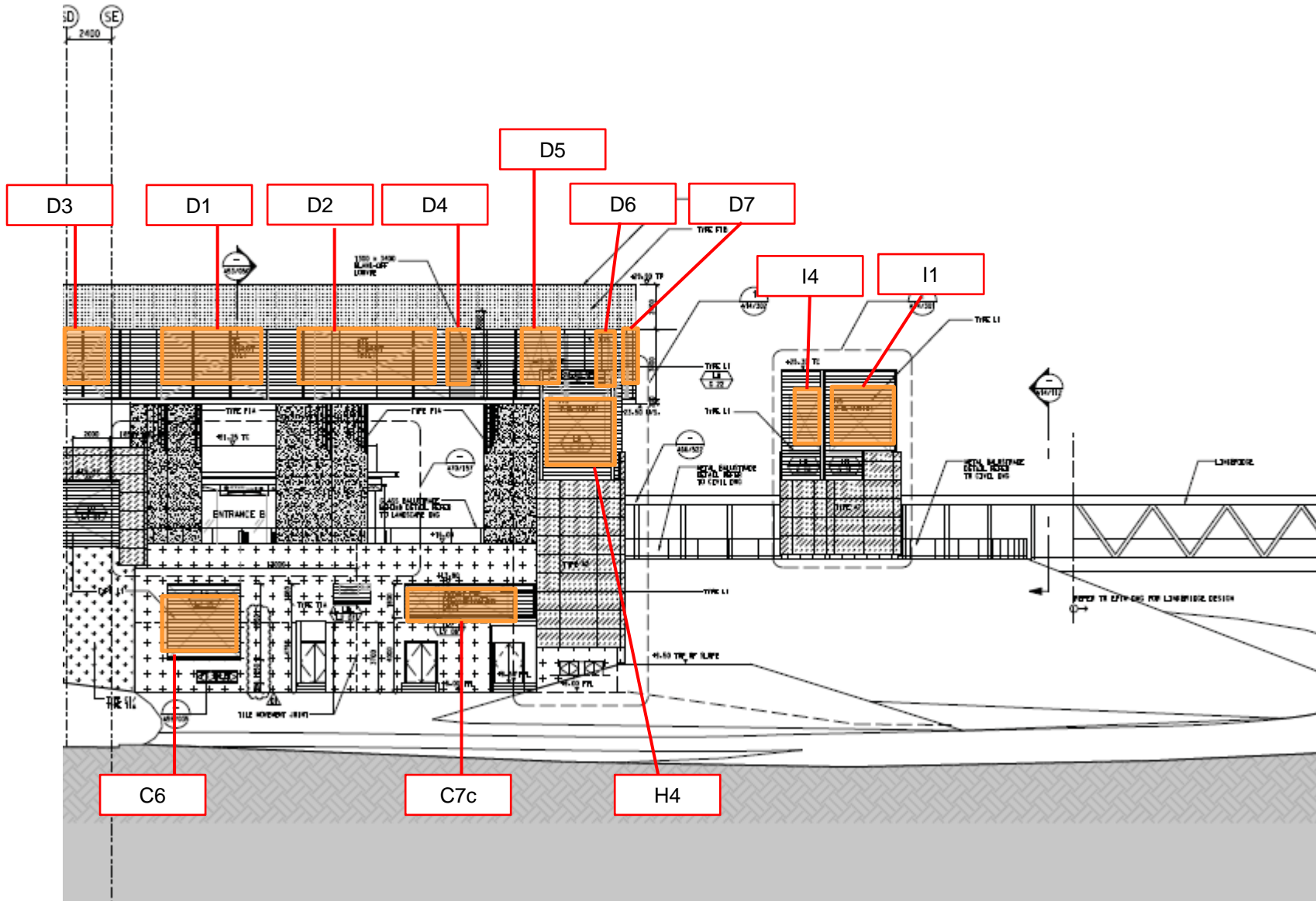


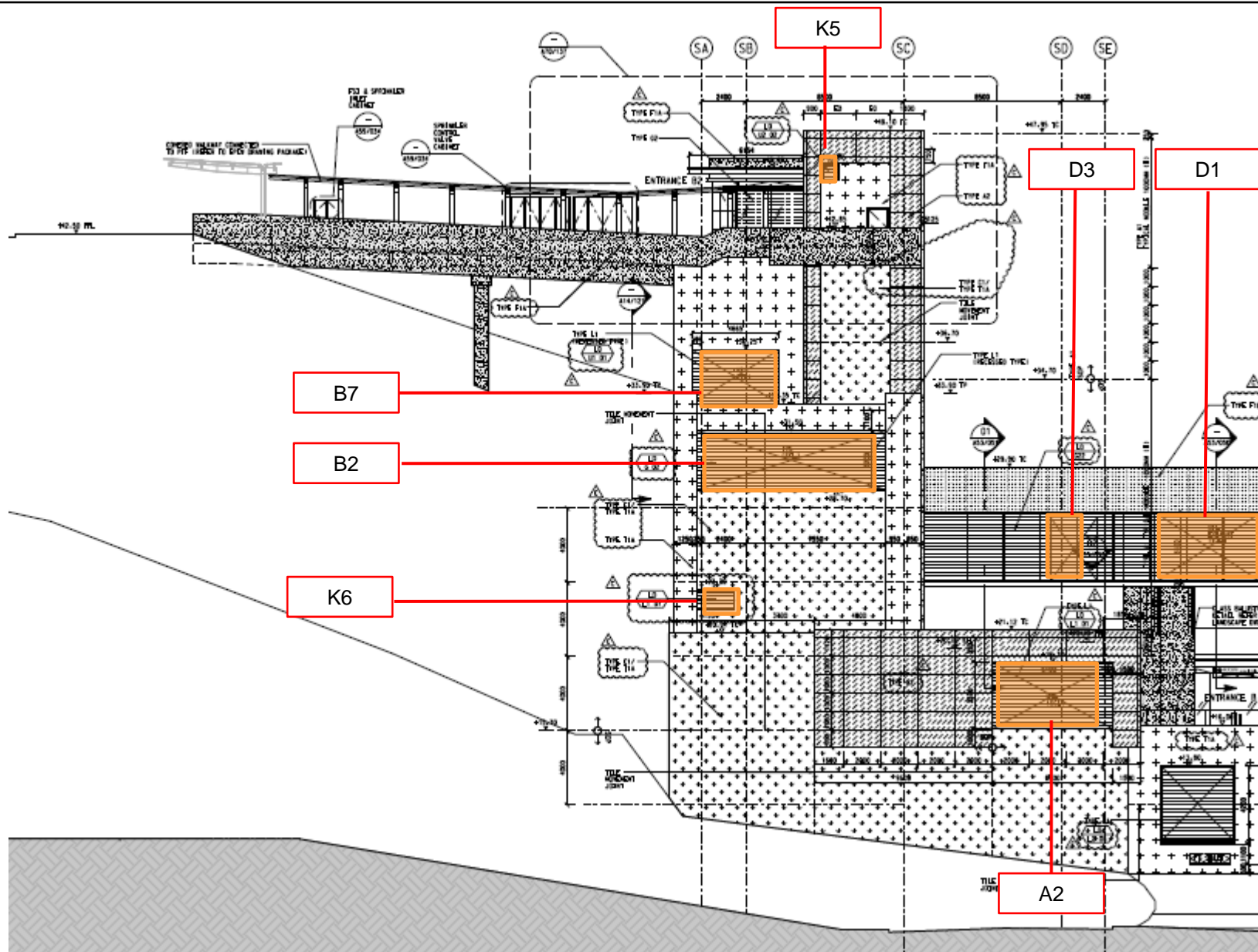




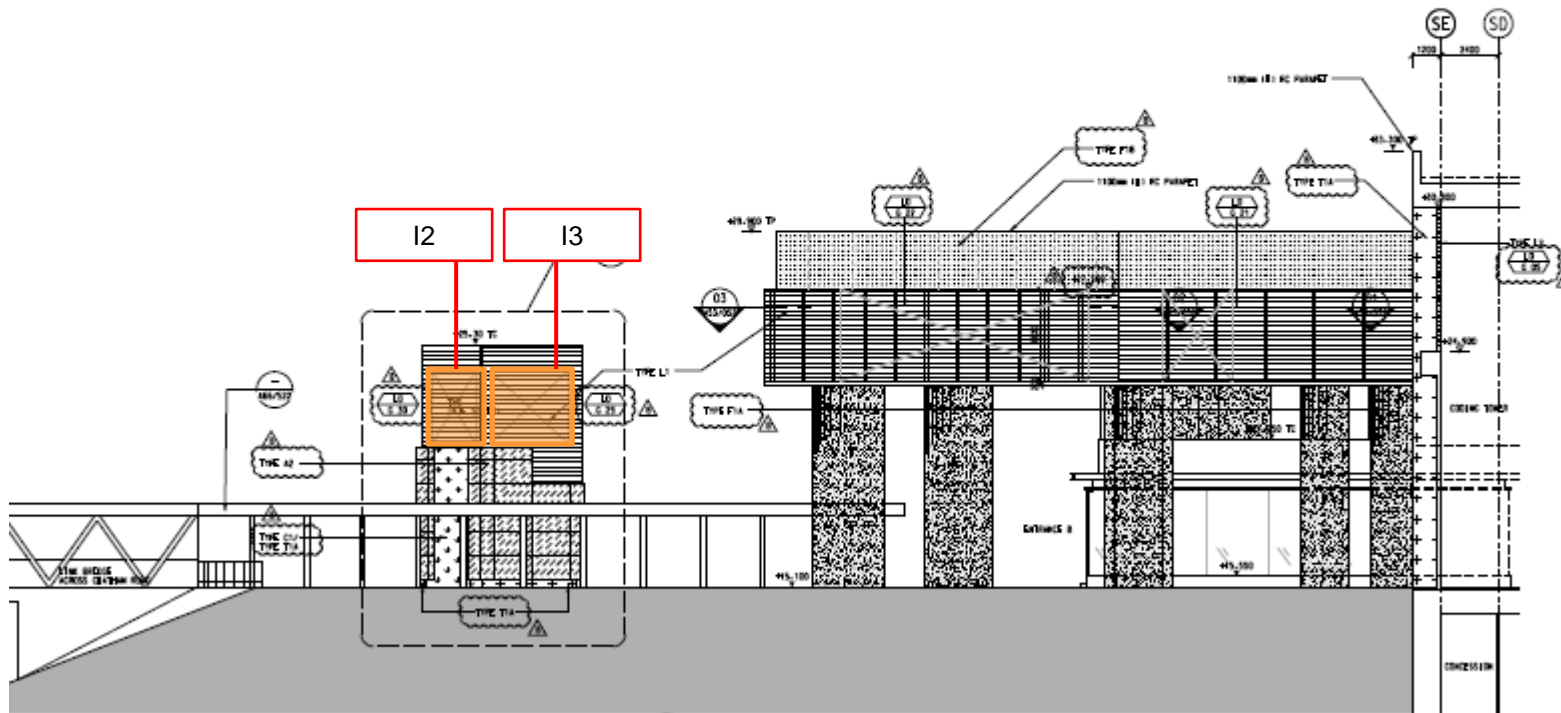


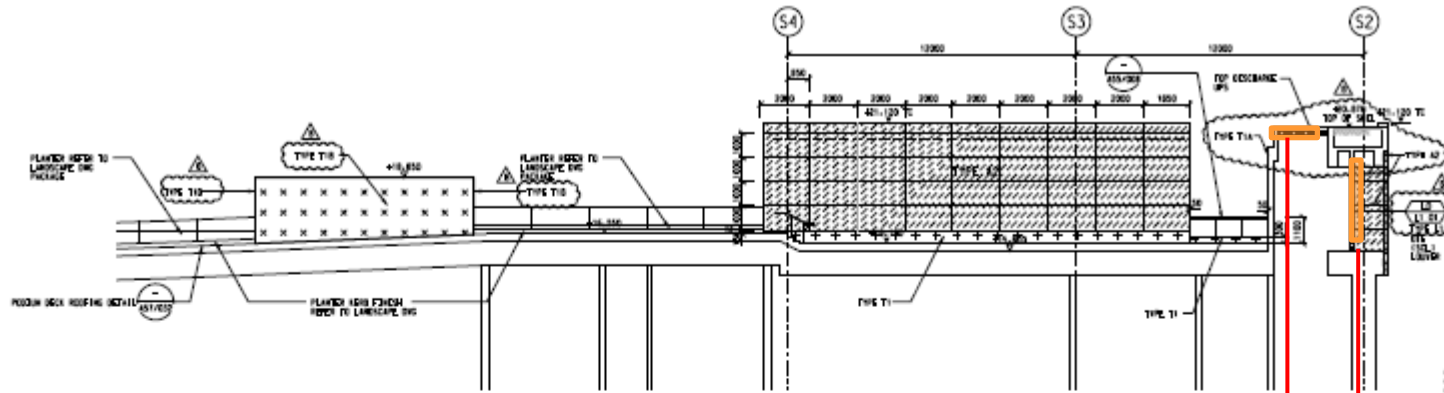






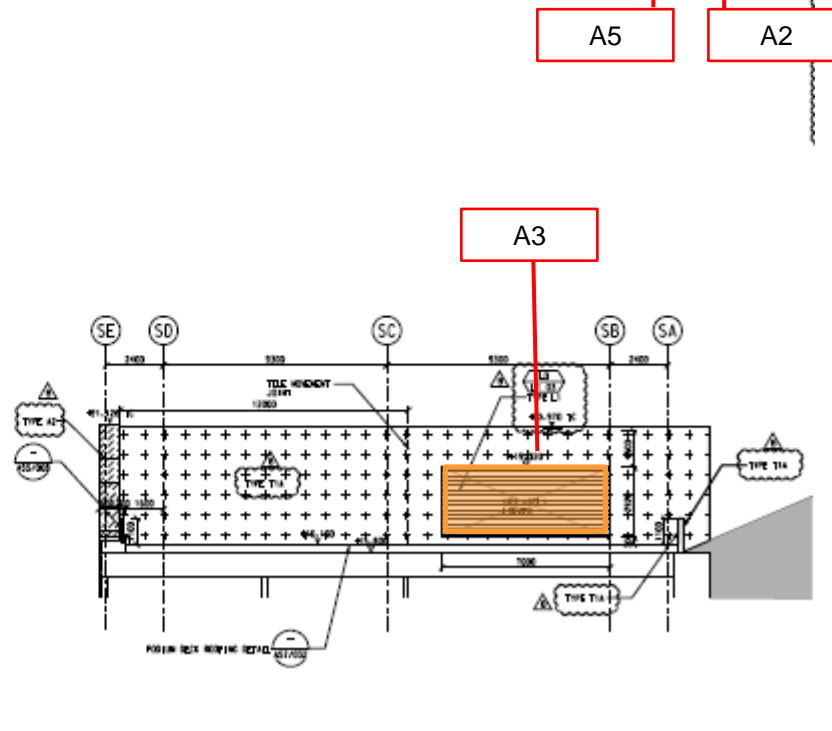
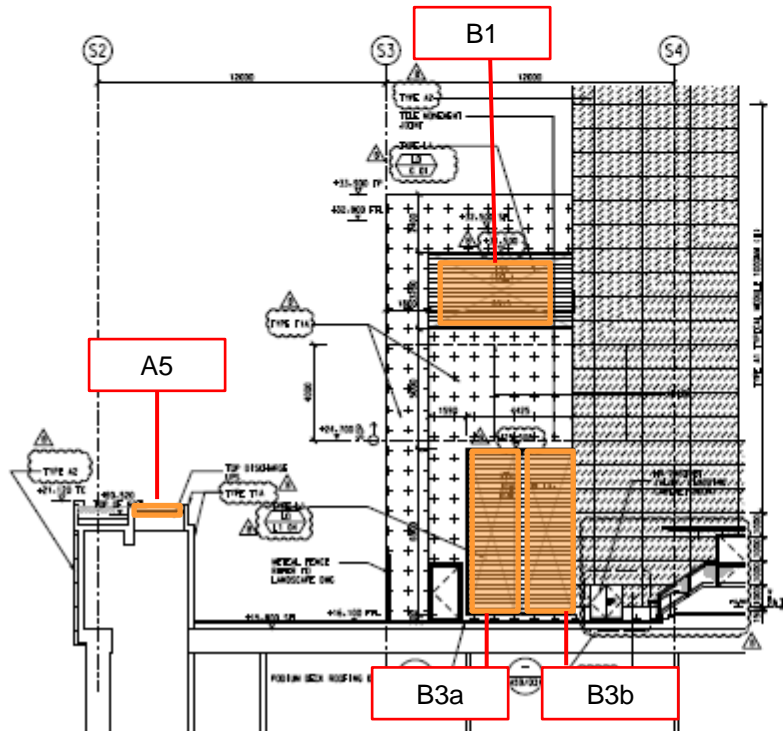


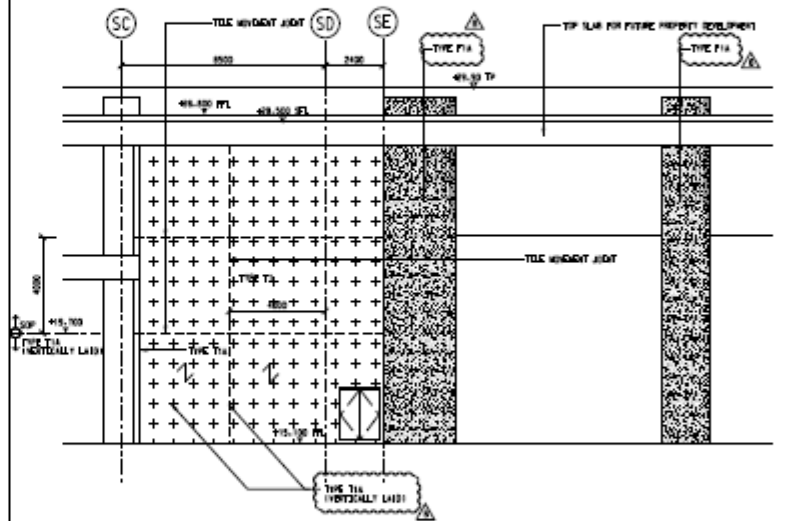
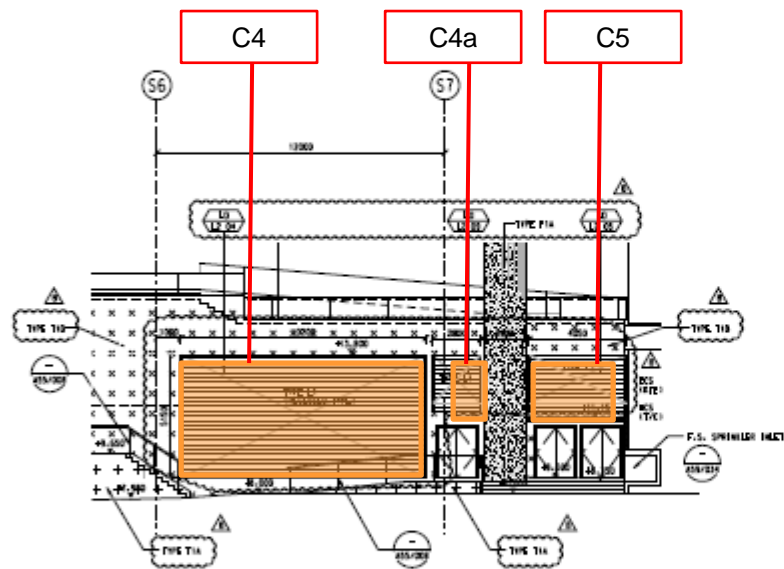


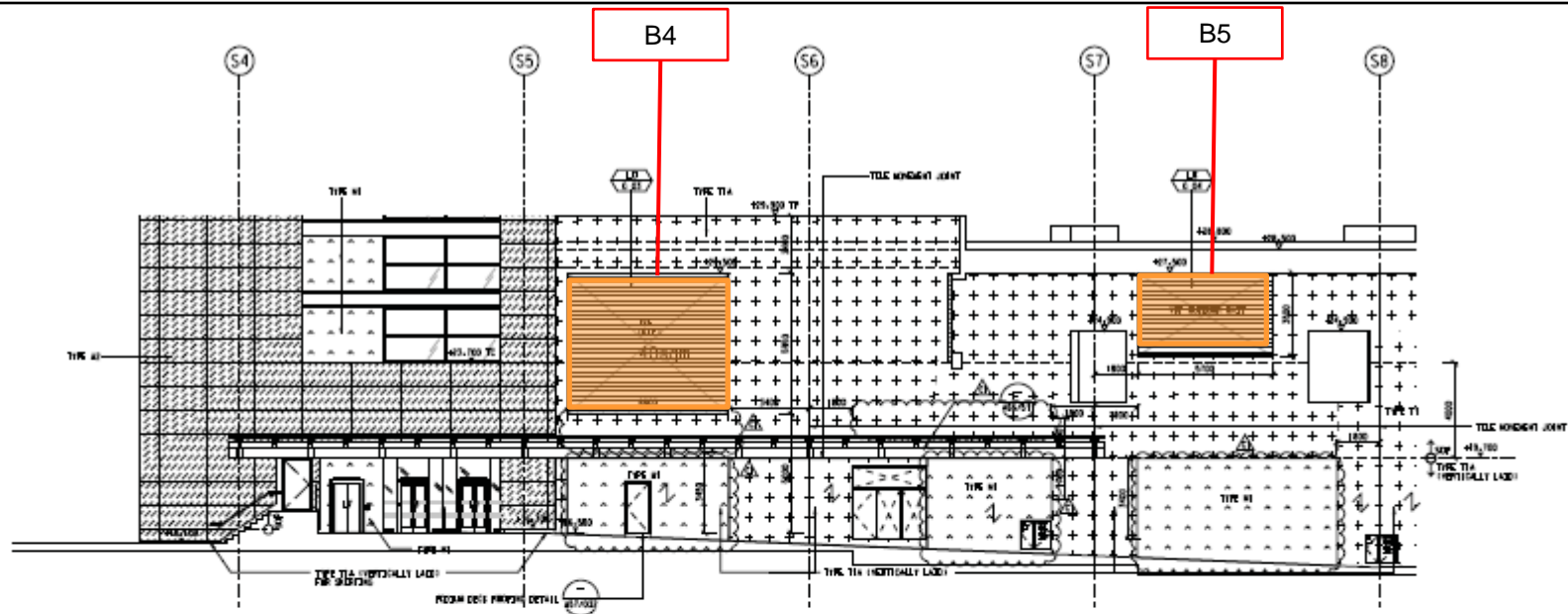


02 NORTHWEST EXTERNAL ELEVATION - ZONE S1

SCALE 1:1000

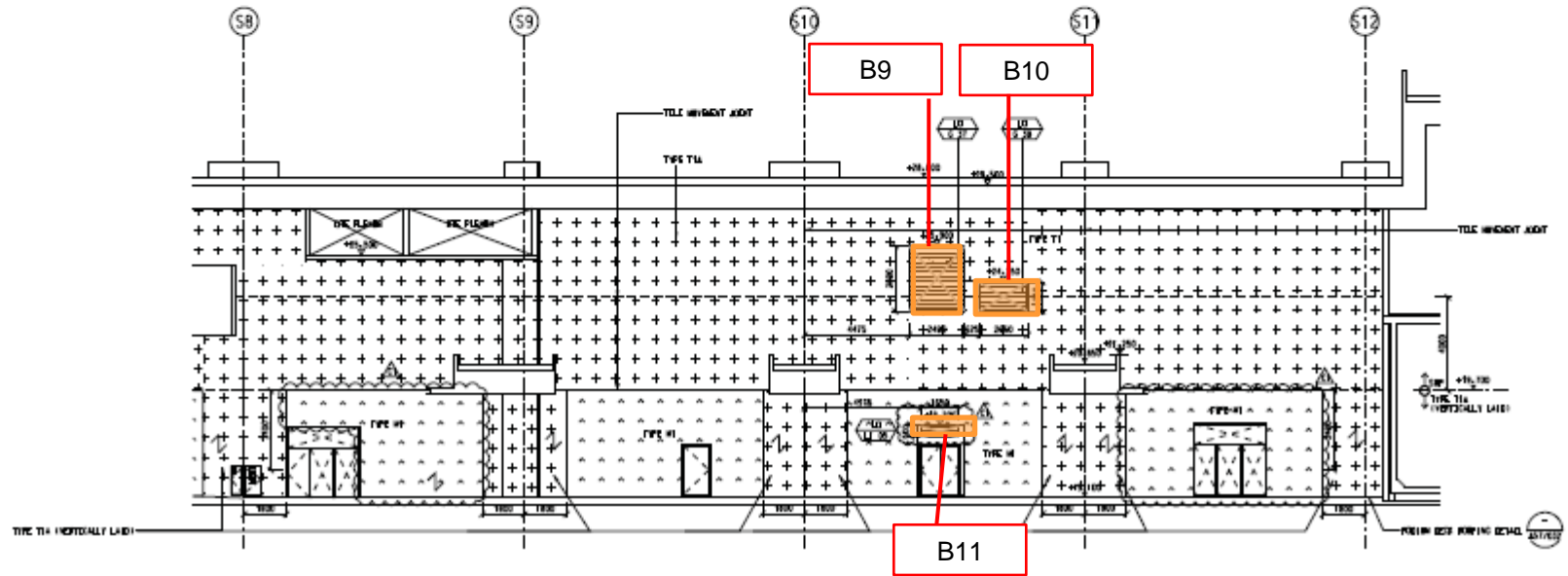


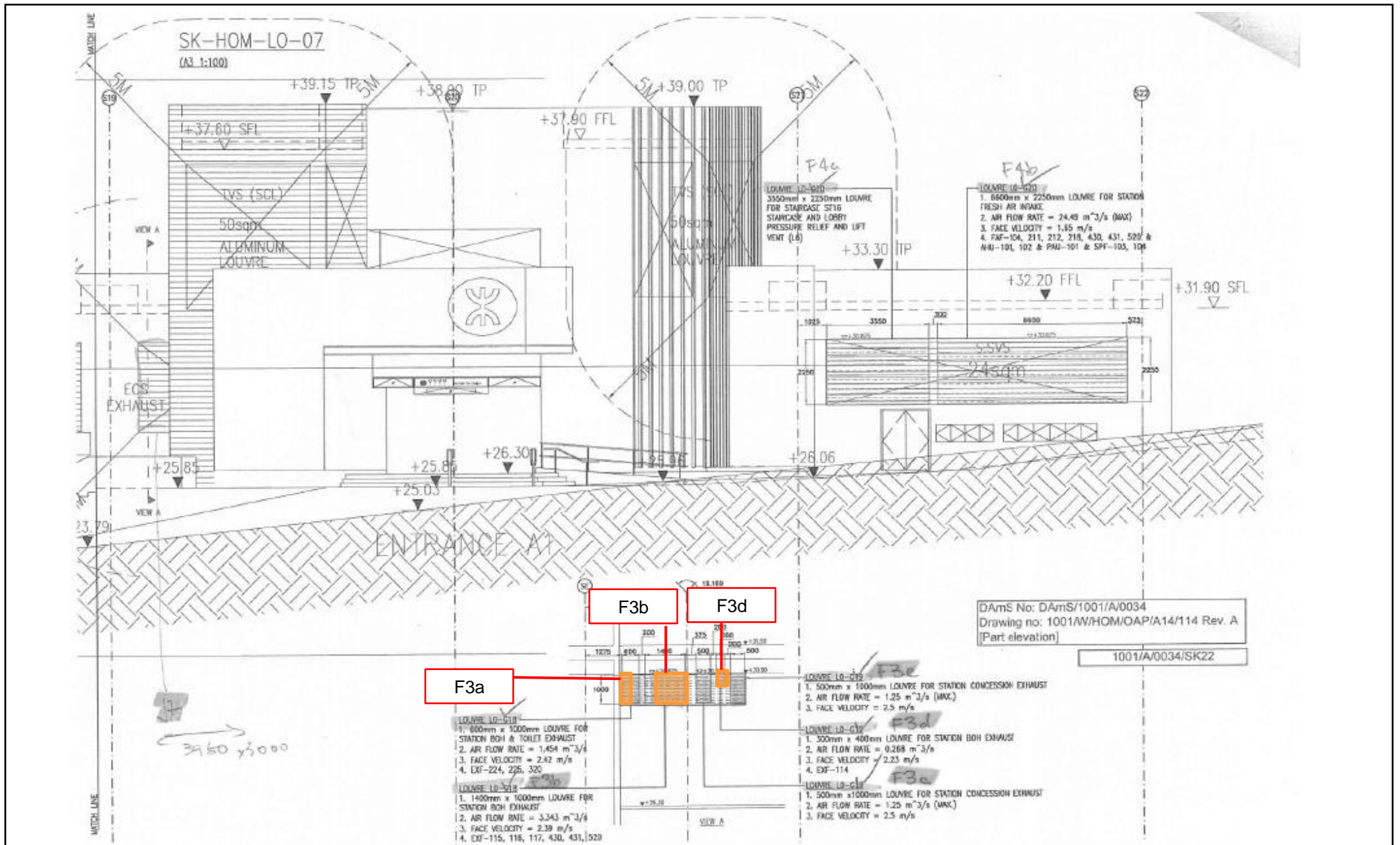




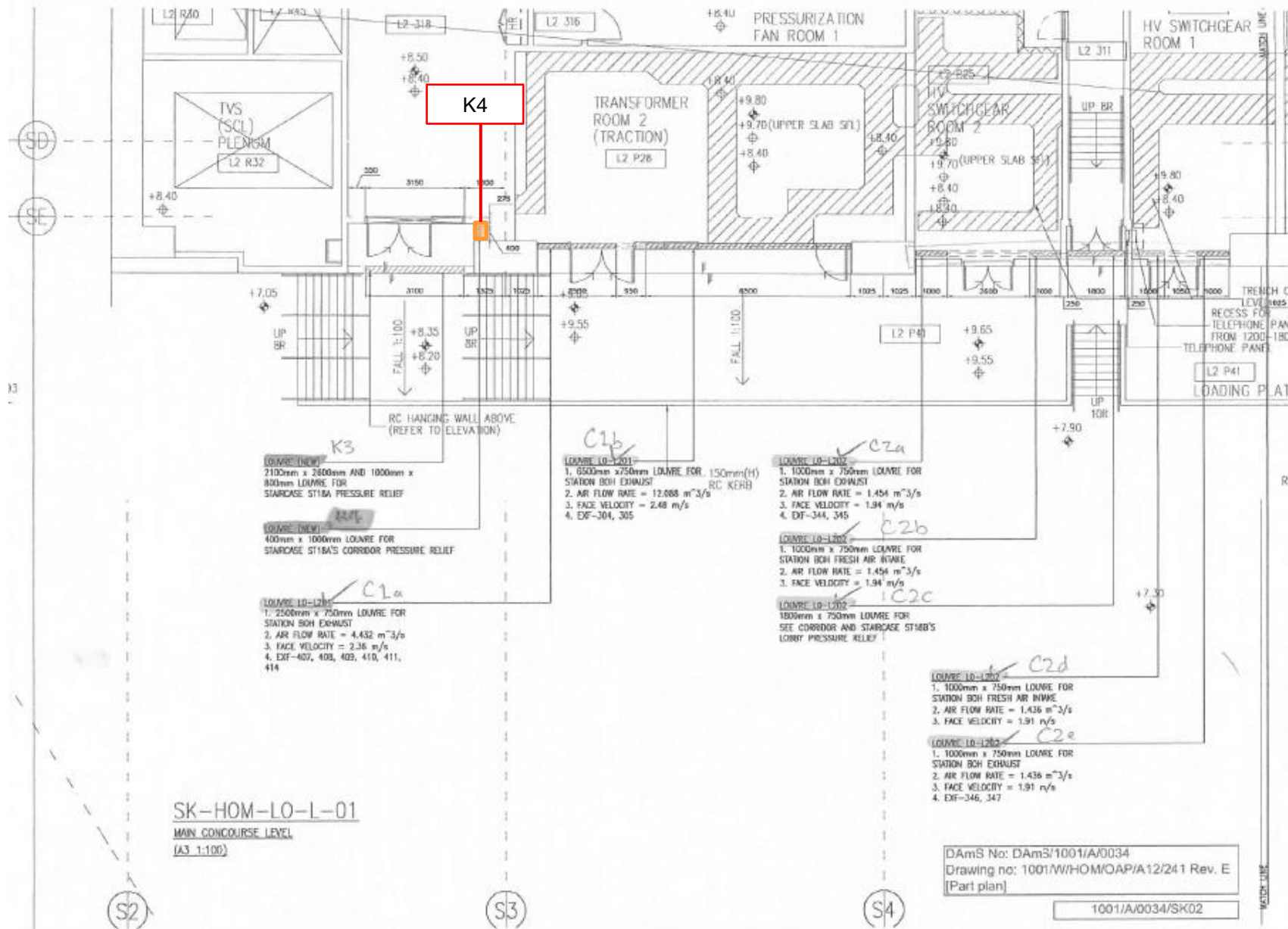
01 SOUTHEAST EXTERNAL ELEVATION - AT GL BETWEEN S4 AND S8

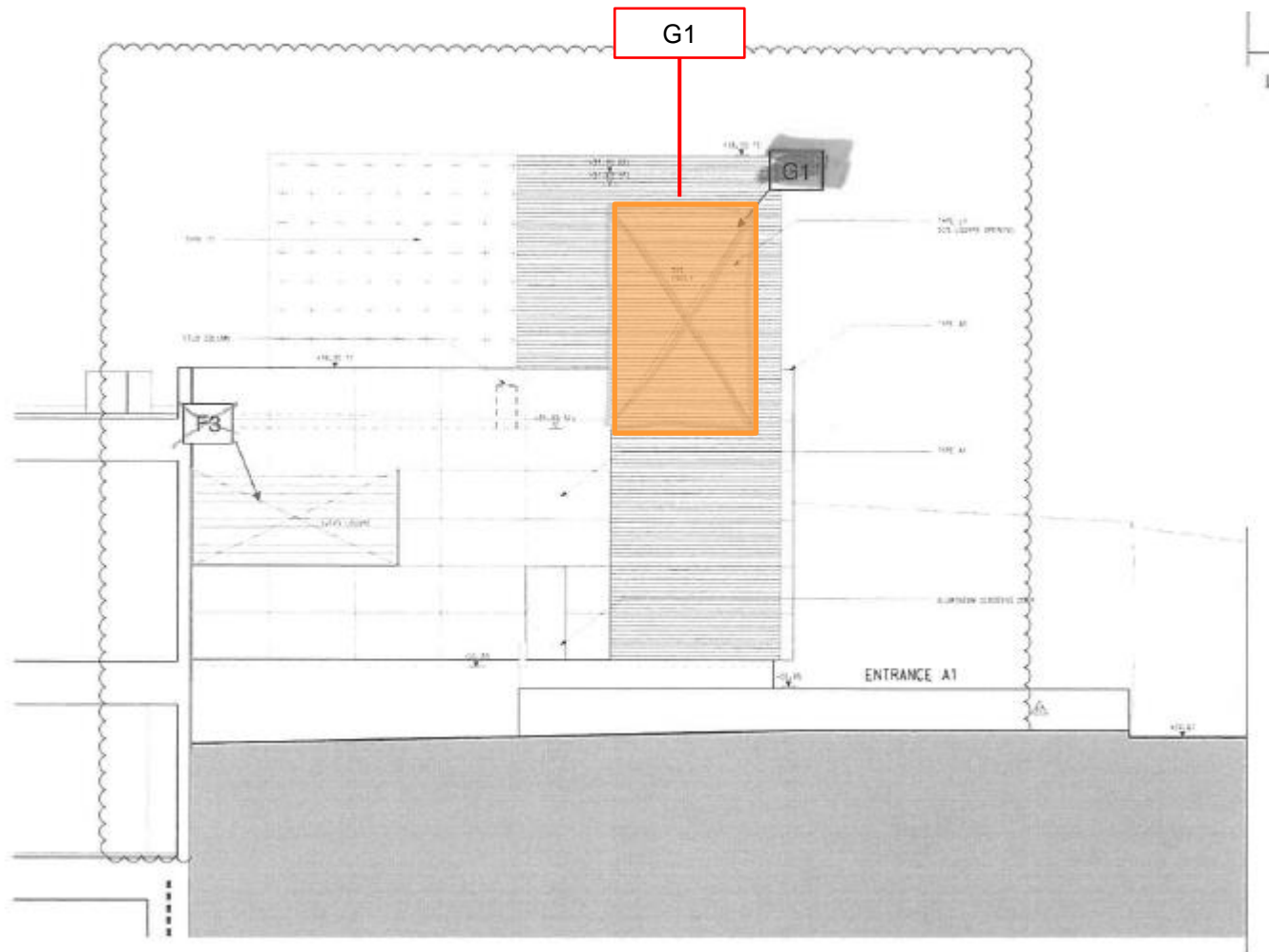
SCALE 1:100

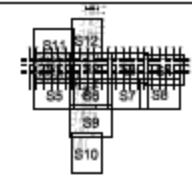
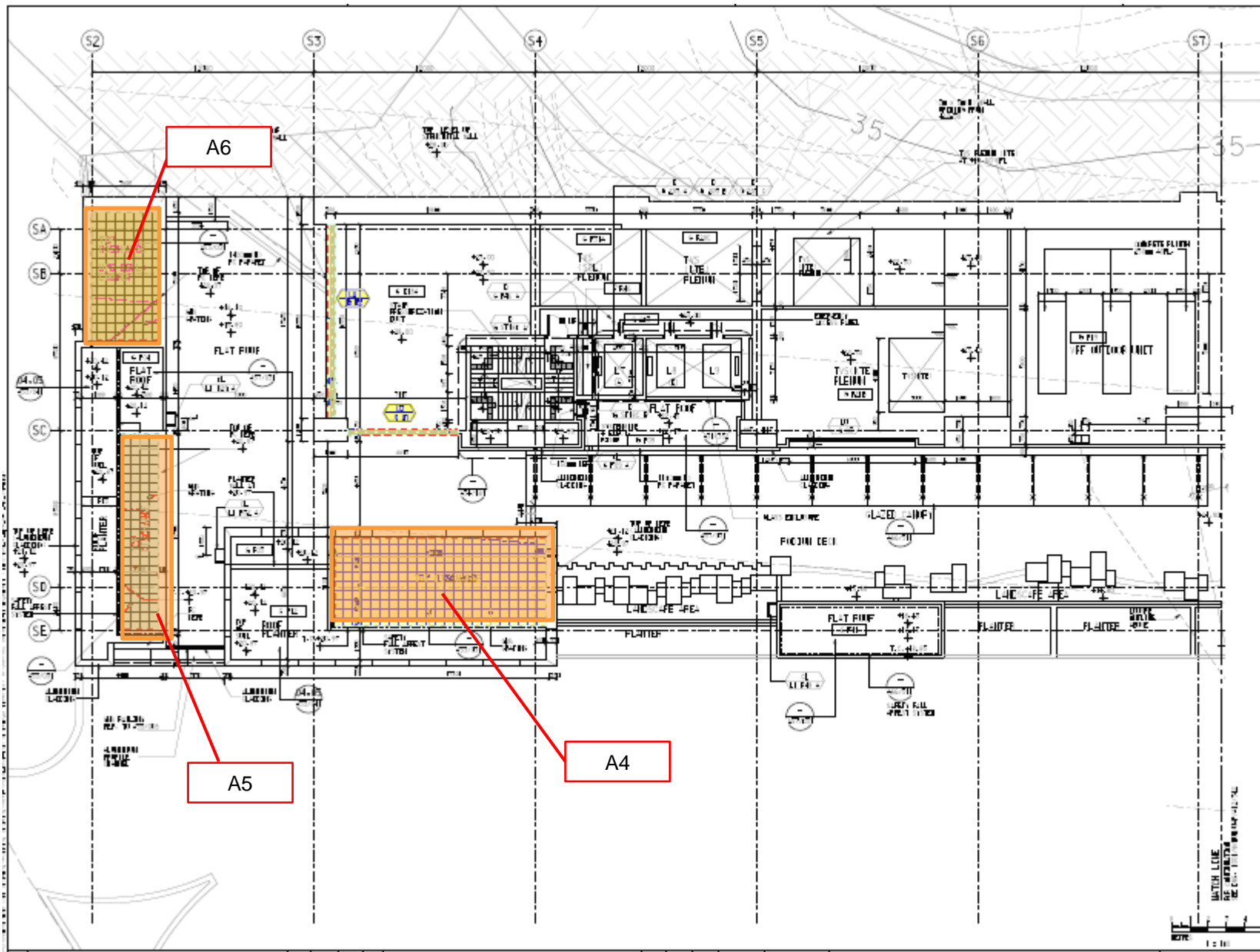












KEY LOCATION PLAN

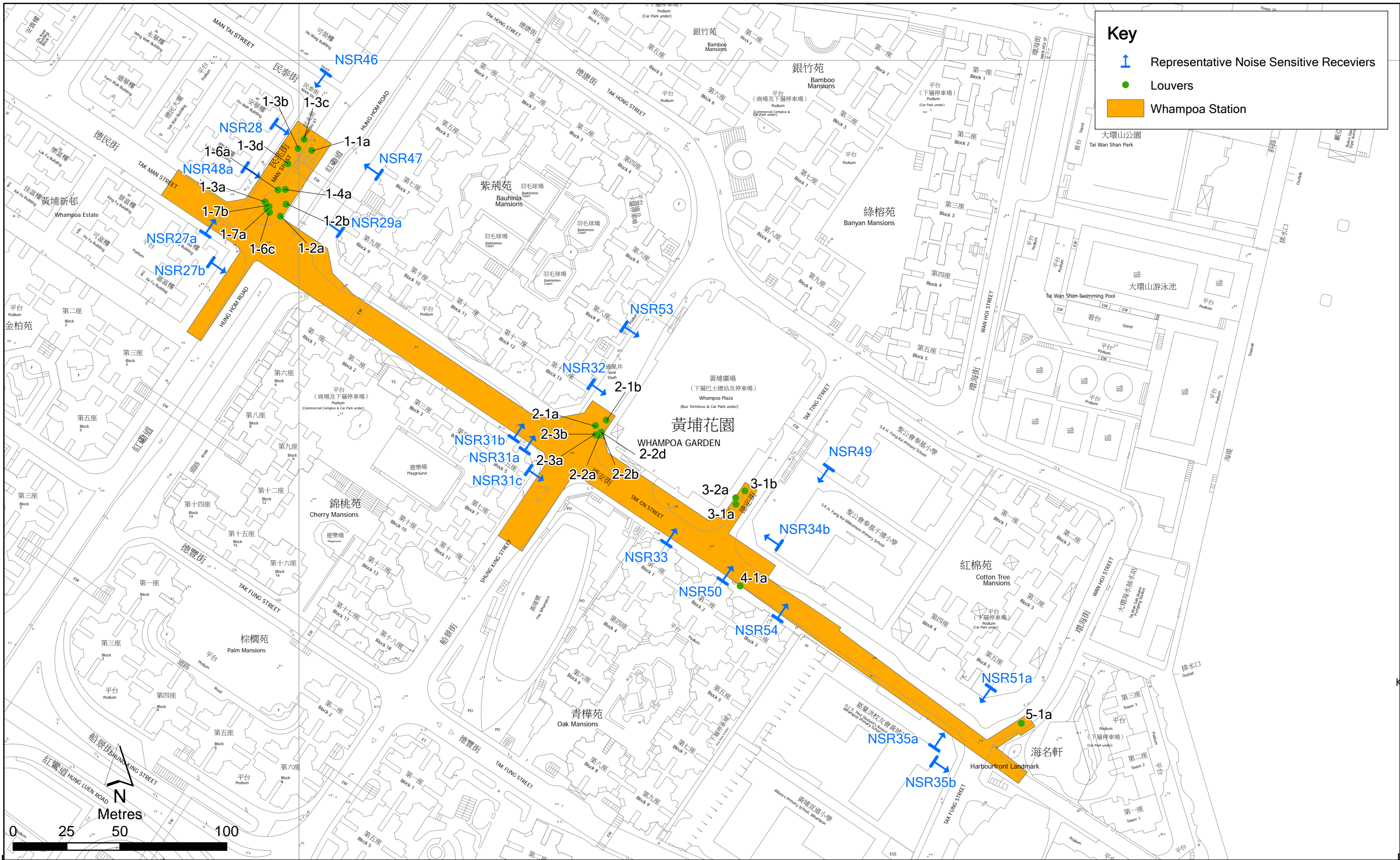
- NOTE:
1. FLAT FLOOR - ALL LEVEL REFERENCE TO L.A.M. - FE OF 311.
  2. L.A.M. - FE - FE OF 311. FINISH HEIGHT - FE OF 311. LEVEL REFERENCE TO L.A.M. - FE OF 311.





Annex A1c

Updated Layout and  
Section Plans of Fixed Plant  
Sources (WHA)



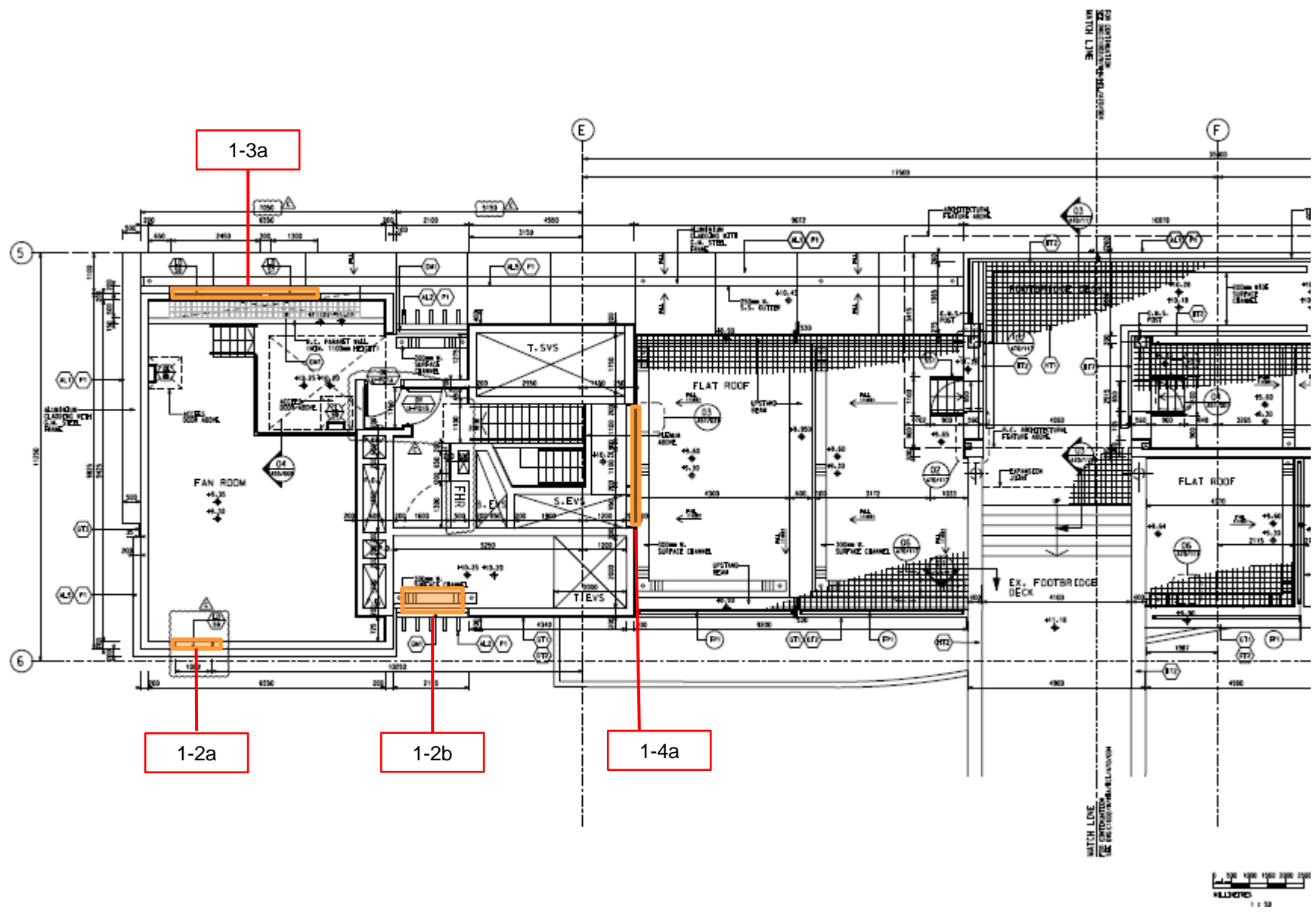
Annex 1c-1

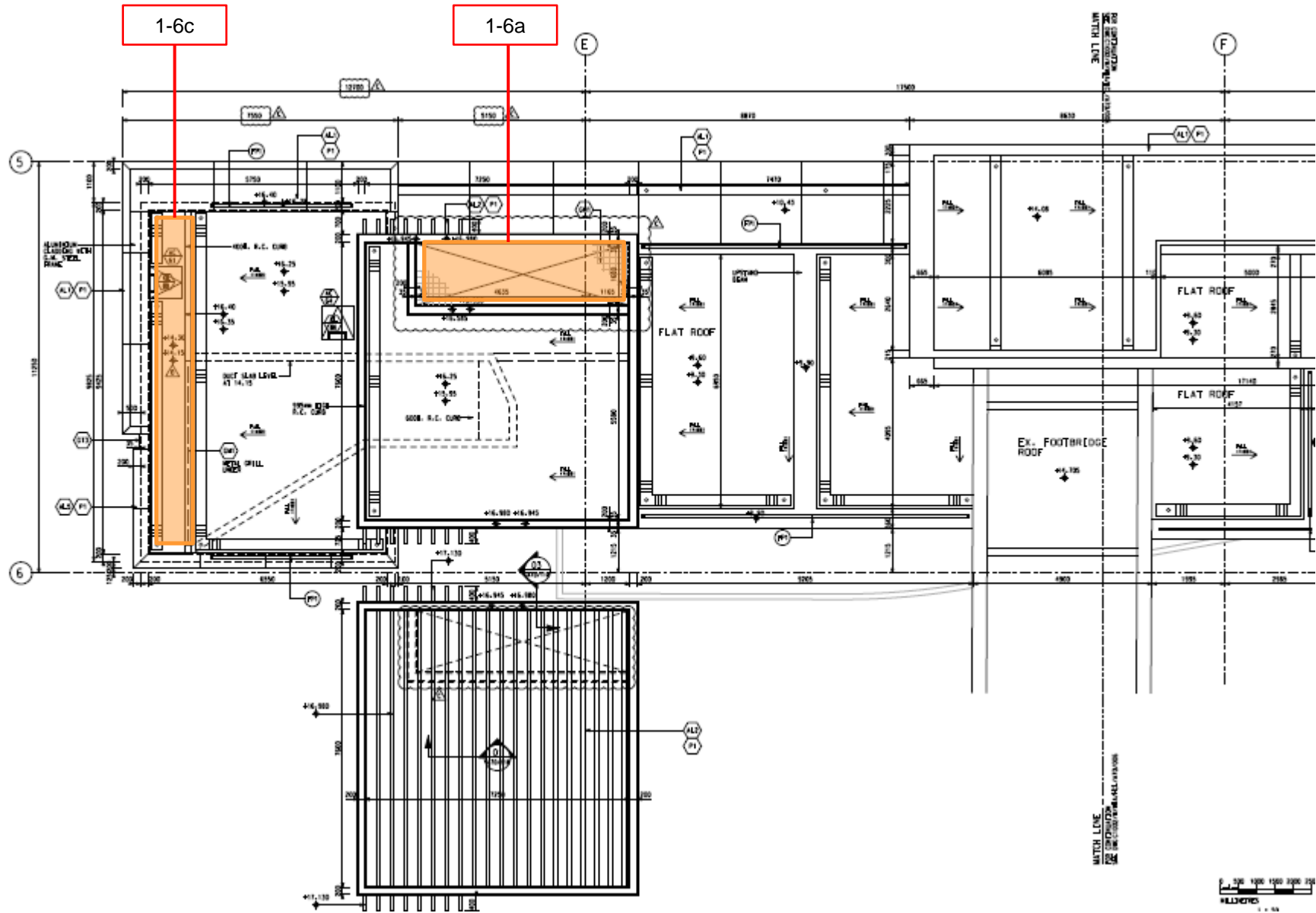
Updated Layout Plan for Louvers at WHA

File: T:\GIS\CONTRACT\0132172\Mxd\Fixed\_Plant\_Noise\_Audit\_Report\0132172\_Louver\_WHA.mxd  
 Date: 25/8/2016

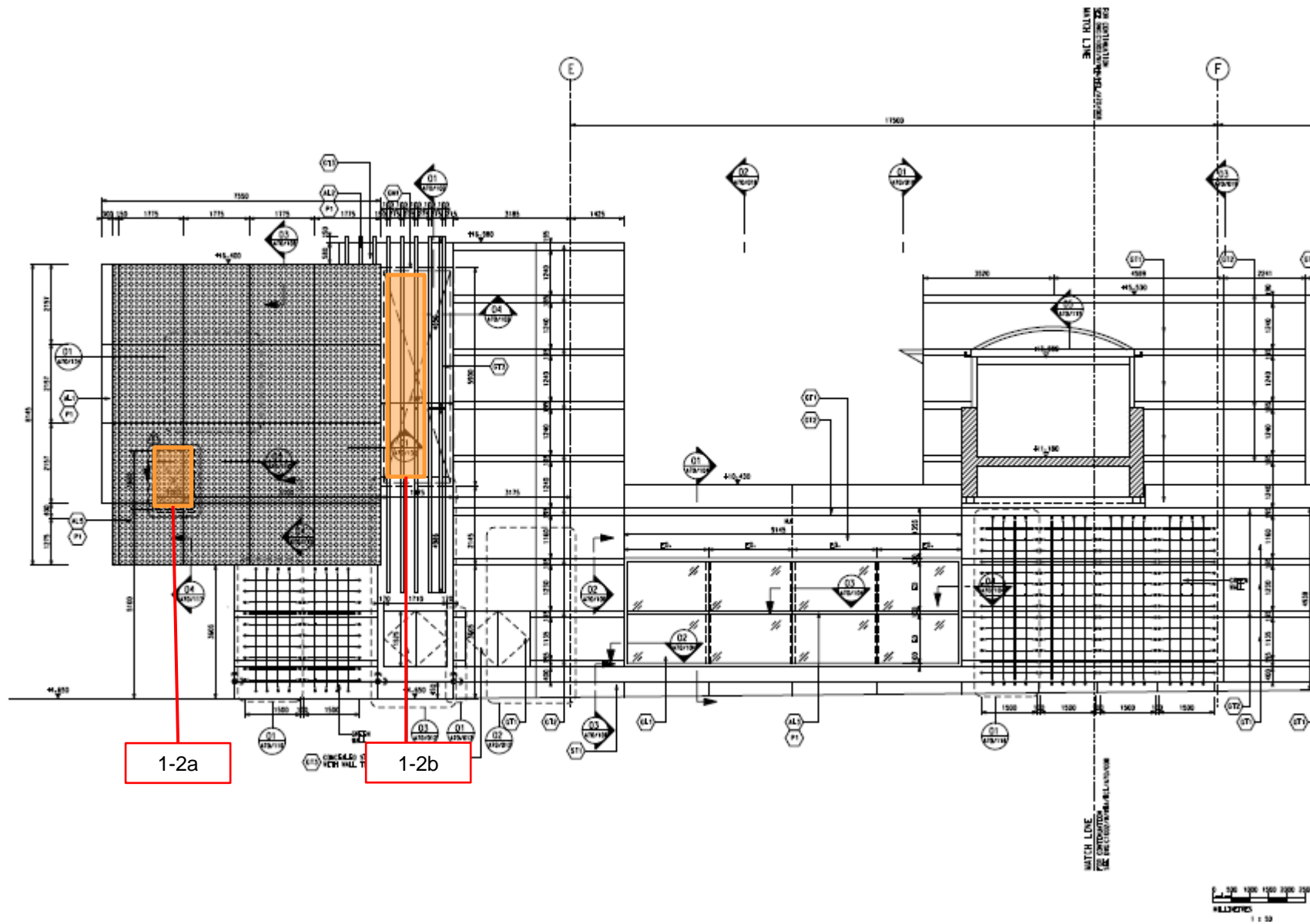
Environmental  
 Resources  
 Management

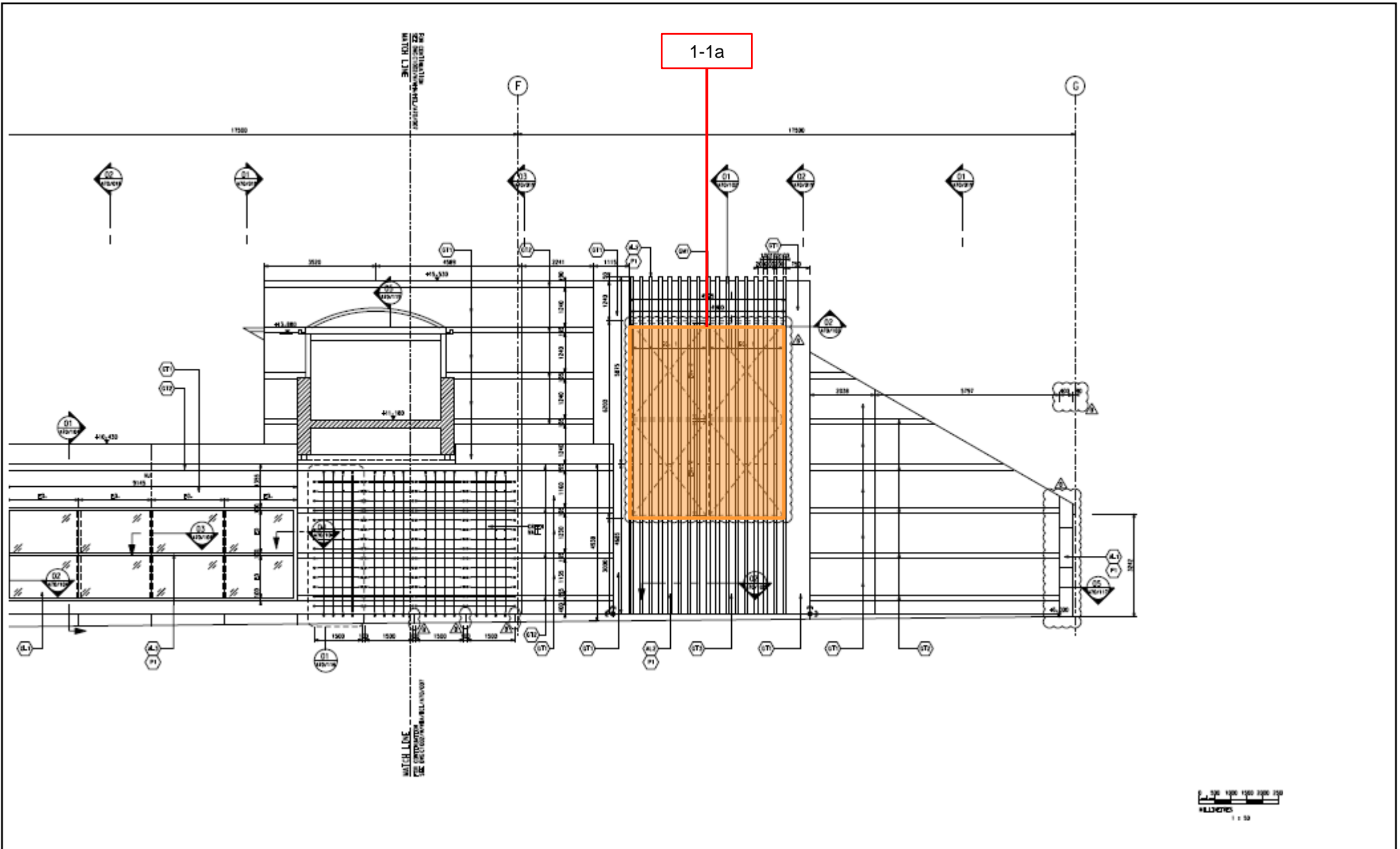












Annex A1c-5

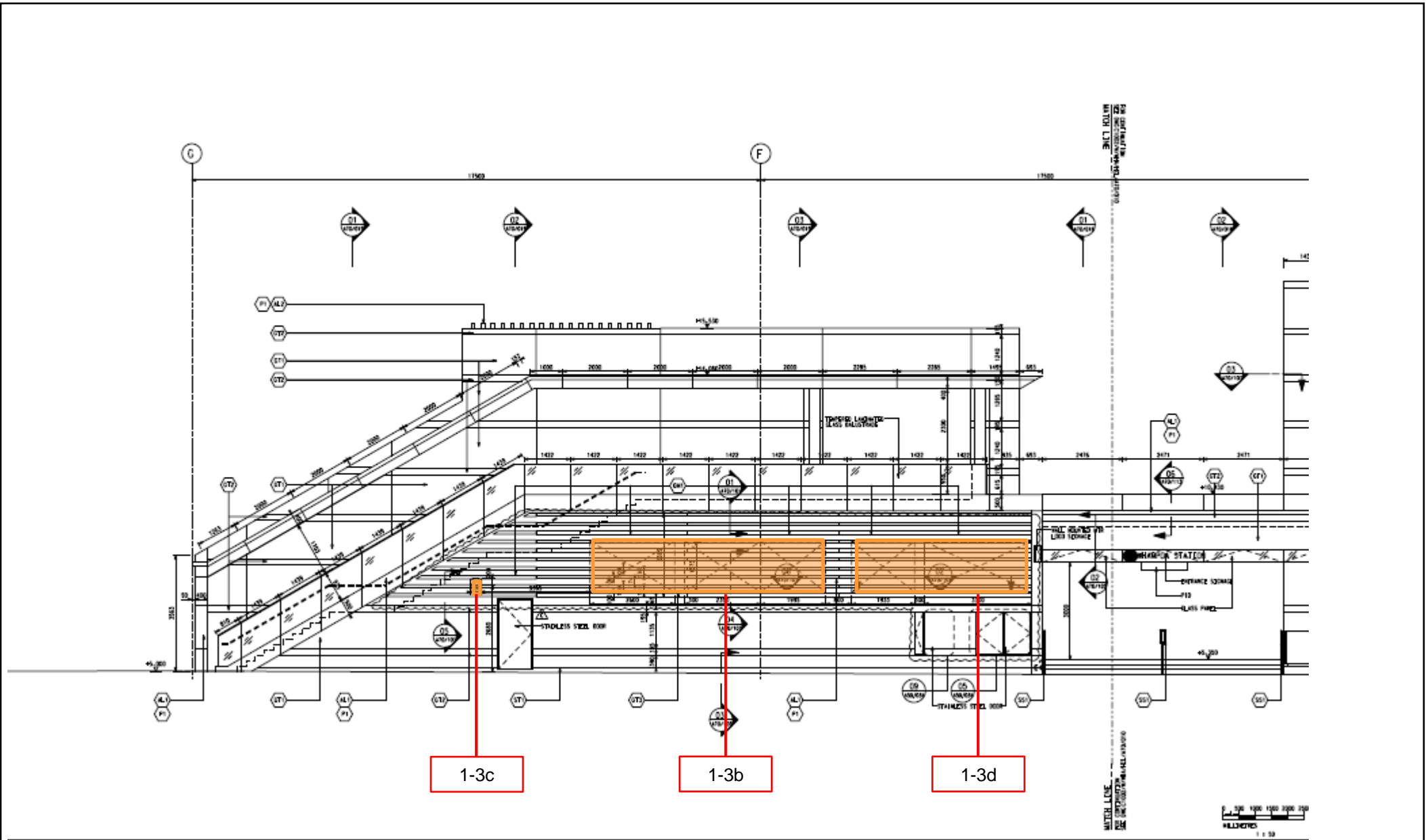
Updated Elevation and Section Plans of Fixed Plant Sources at WHA

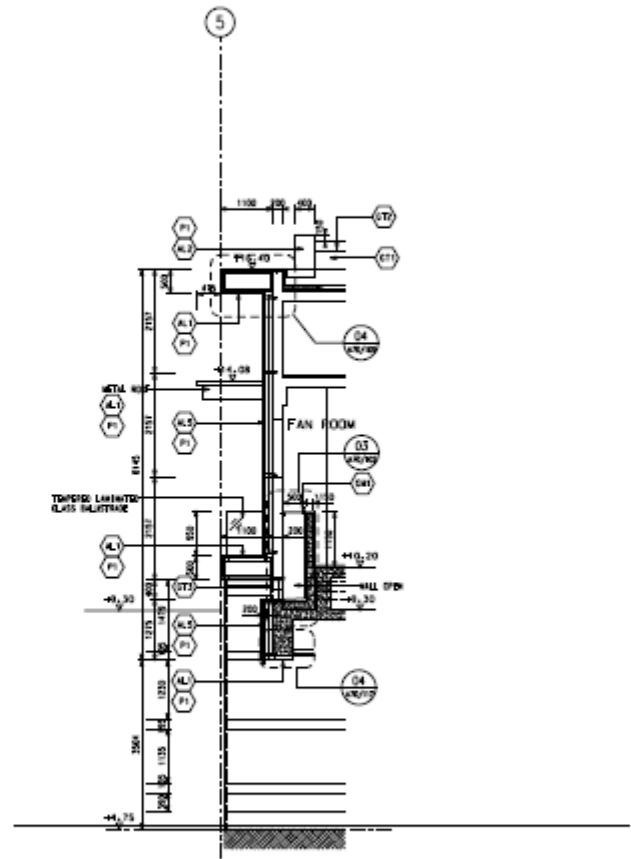
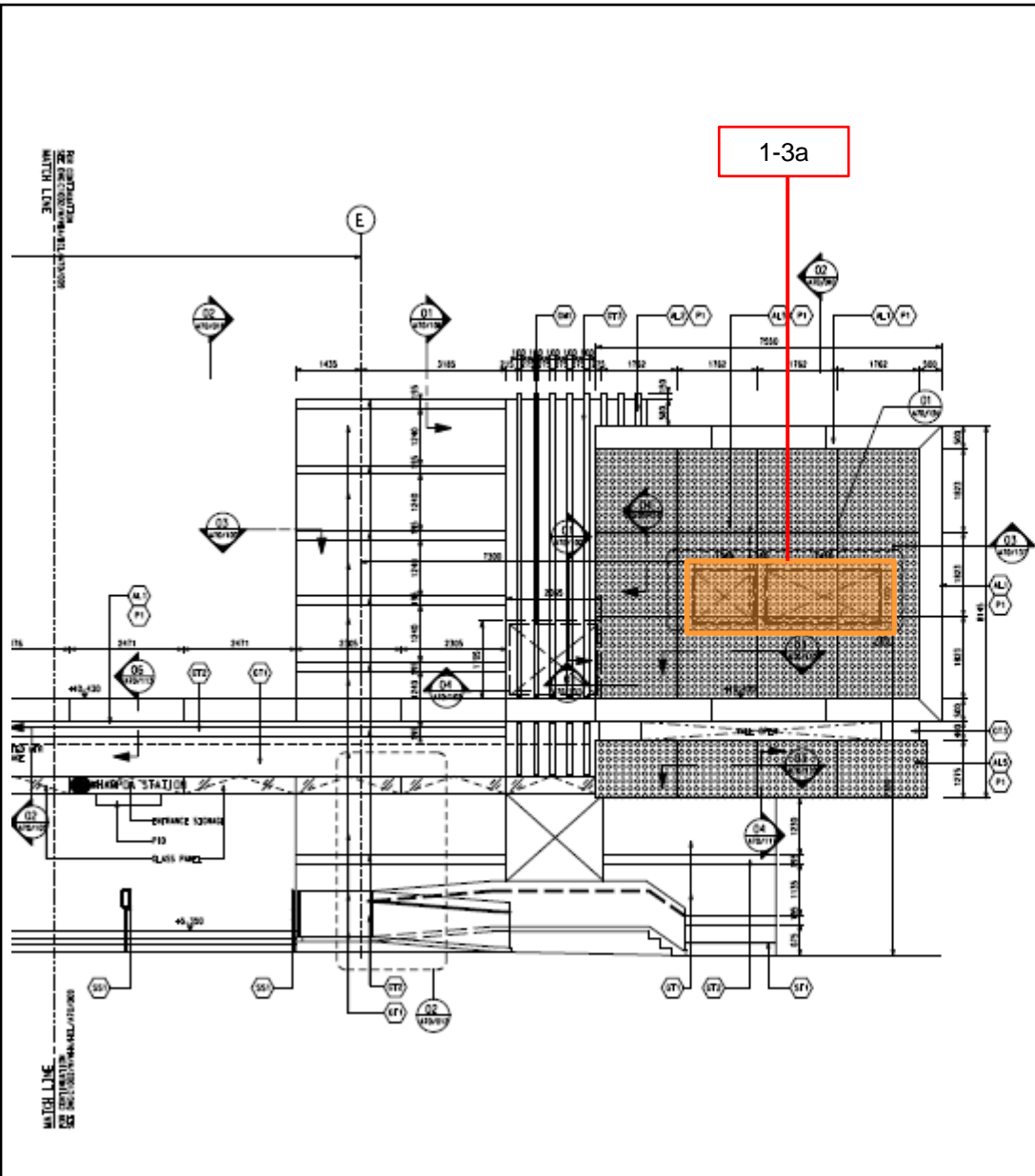
DATE: 09/08/2016

Environmental  
Resources  
Management









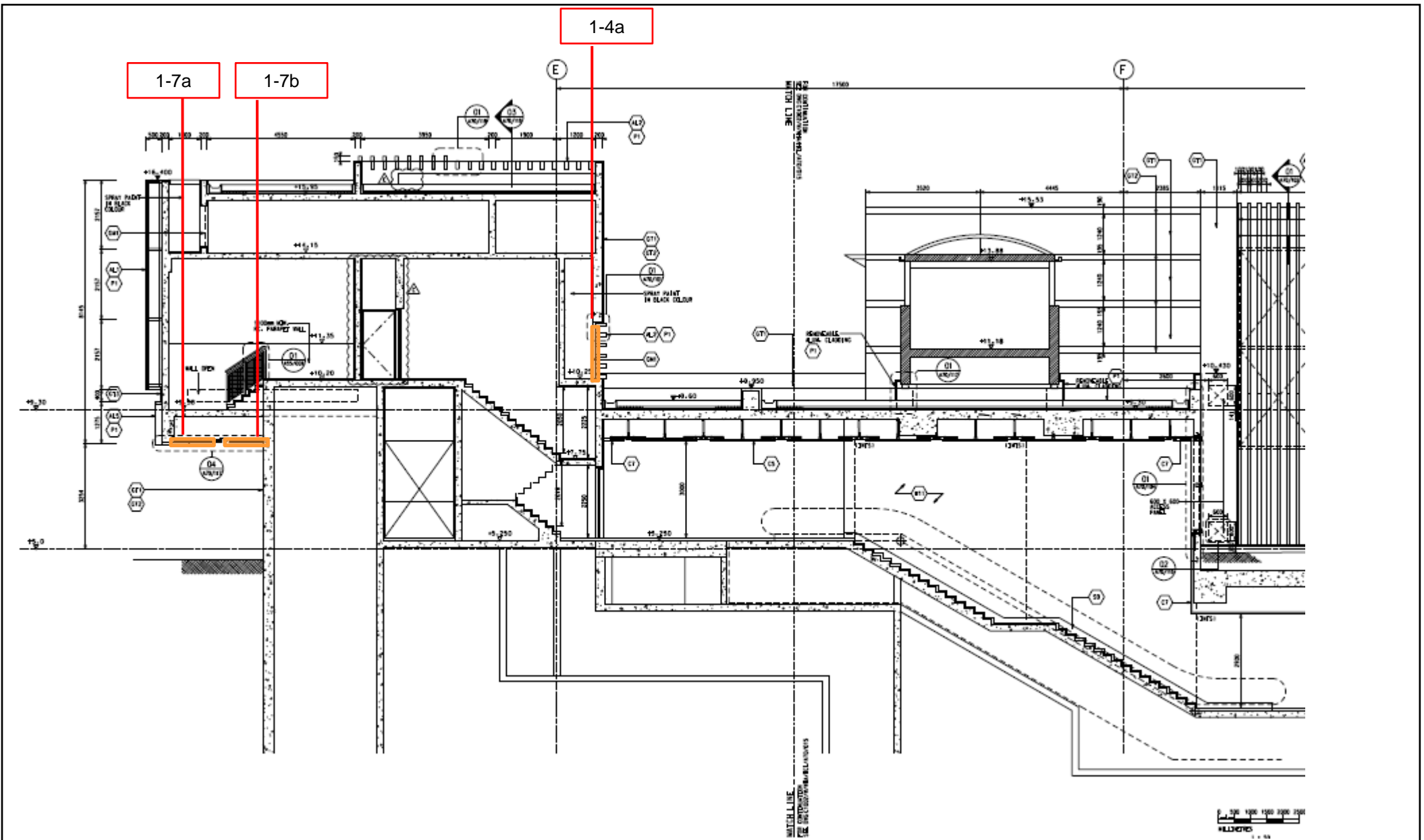
Annex A1c-7

Updated Elevation and Section Plans of Fixed Plant Sources at WHA

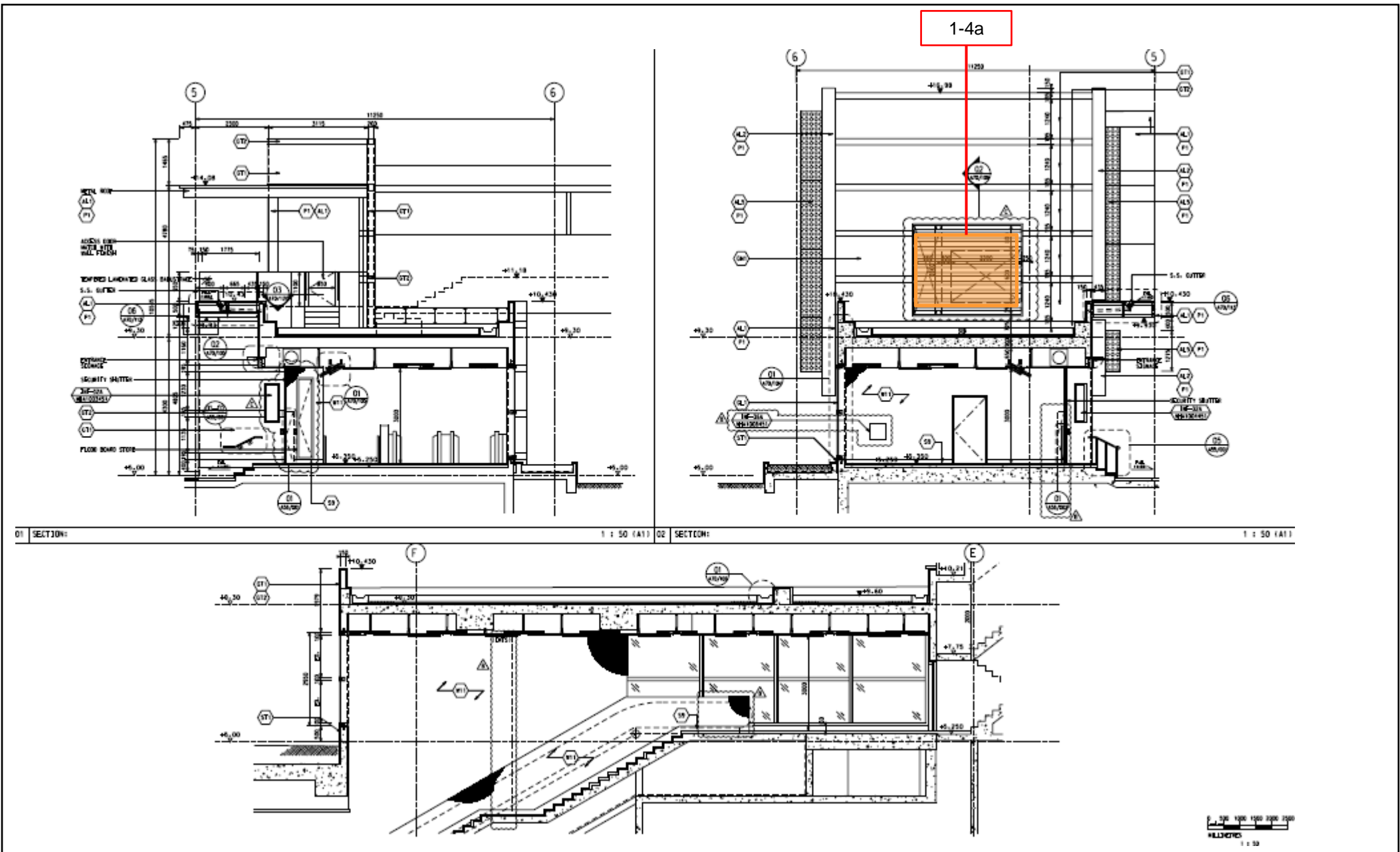
DATE: 09/08/2016

Environmental Resources Management





Remark: Fixed plant noise sources "1-7a" and "1-7b" are faced downward to the ground level



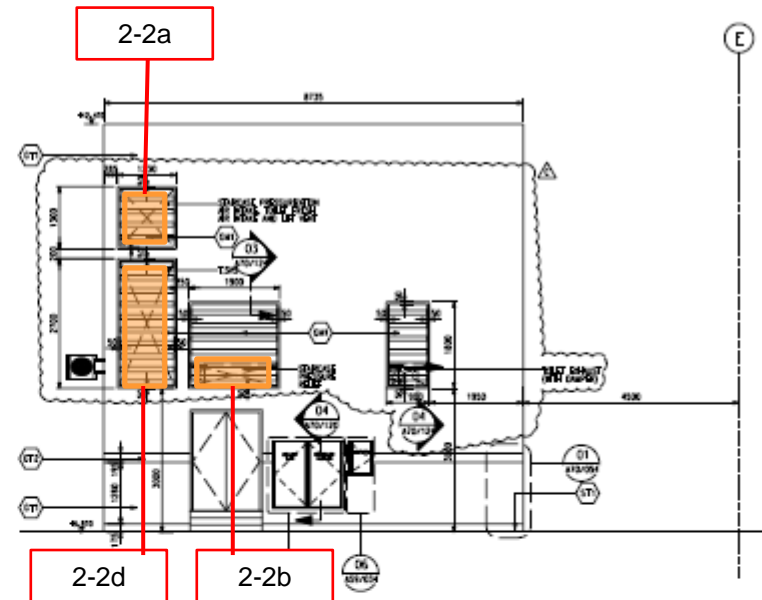
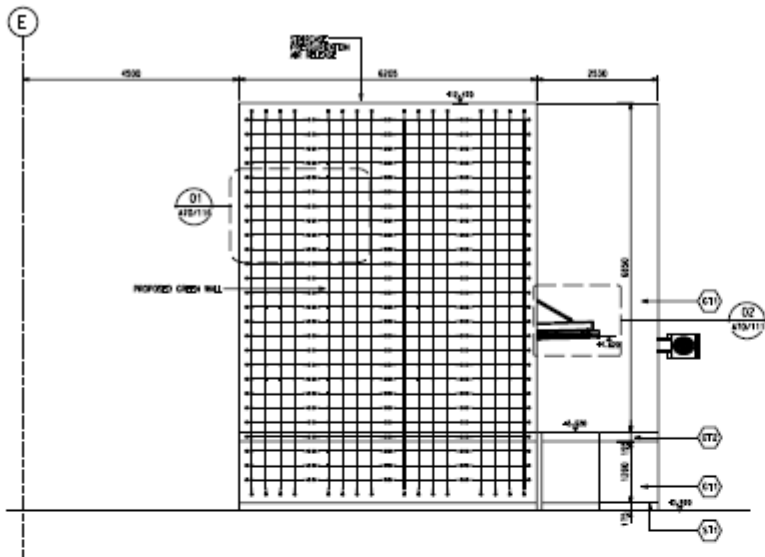
Annex A1c-9

Updated Elevation and Section Plans of Fixed Plant Sources at WHA

DATE: 09/08/2016

Environmental  
Resources  
Management



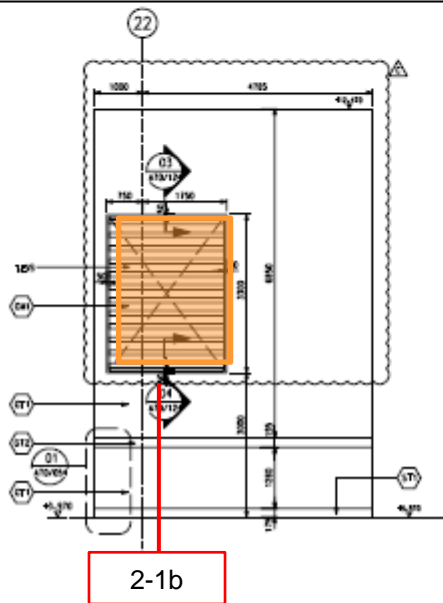


ELEVATION:

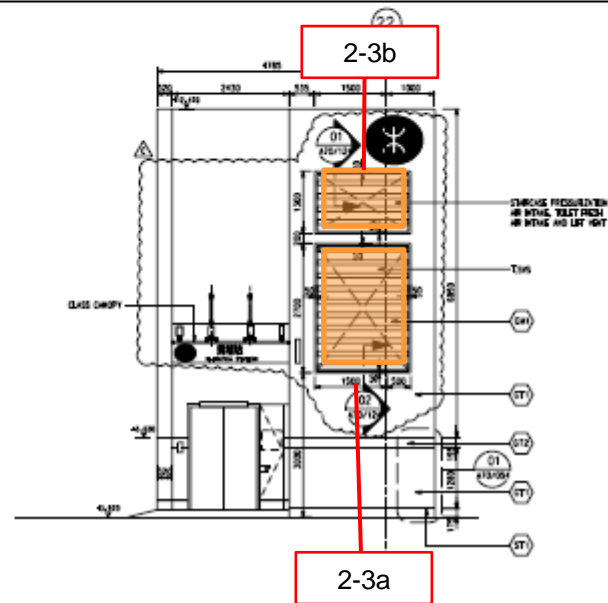
1 : 50 (A1)  
1 : 100 (A3)

ELEVATION:

1 : 50 (A1)  
1 : 100 (A3)

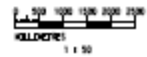
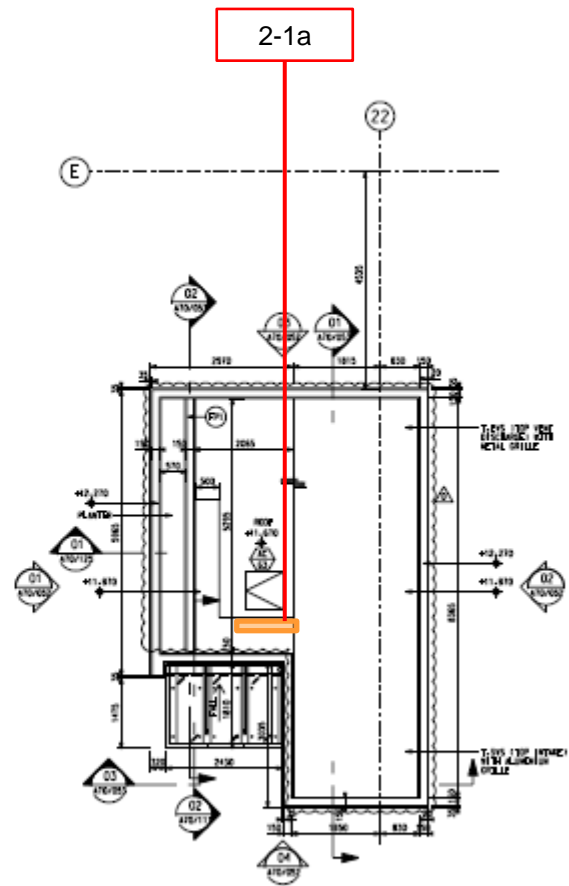
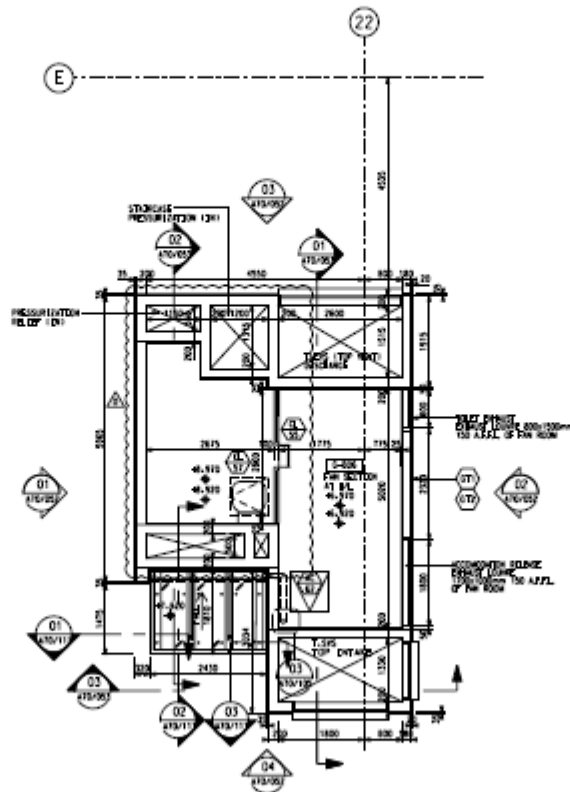
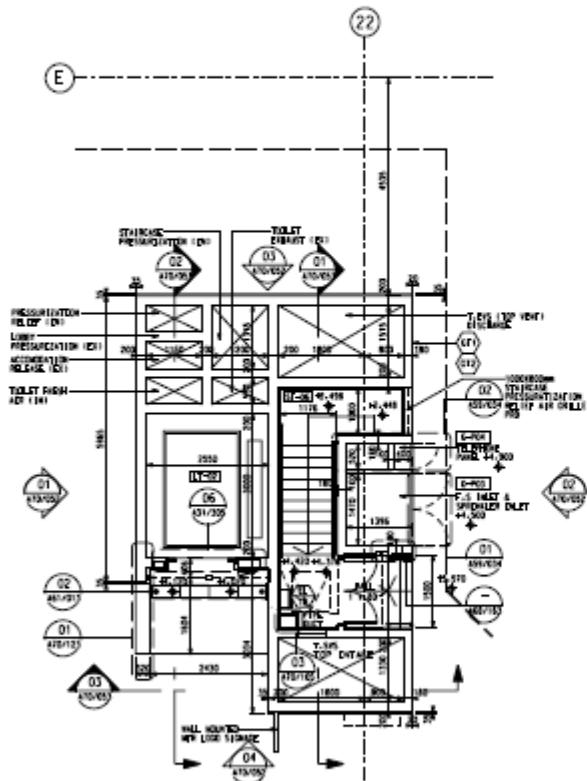


2-1b

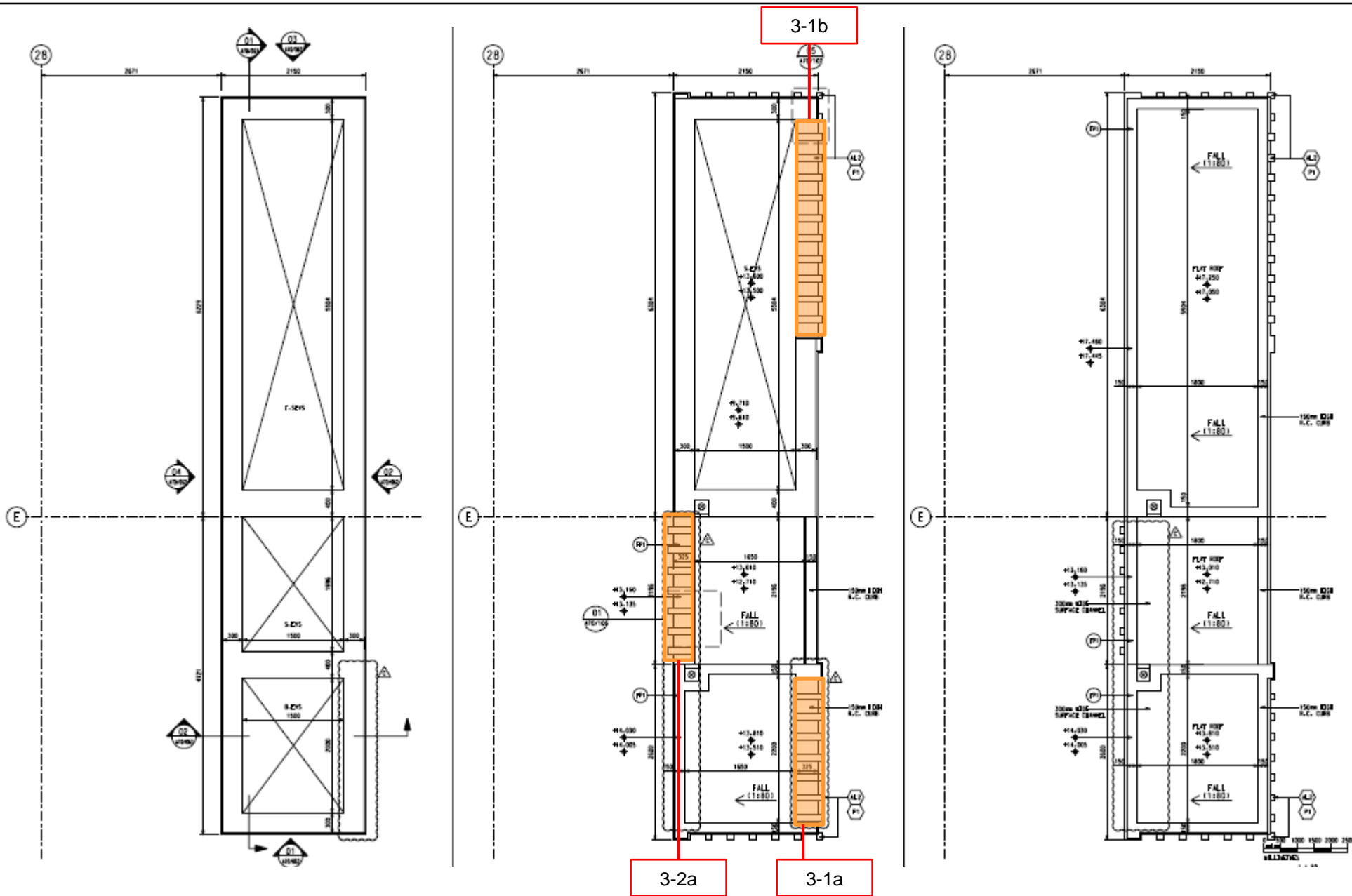


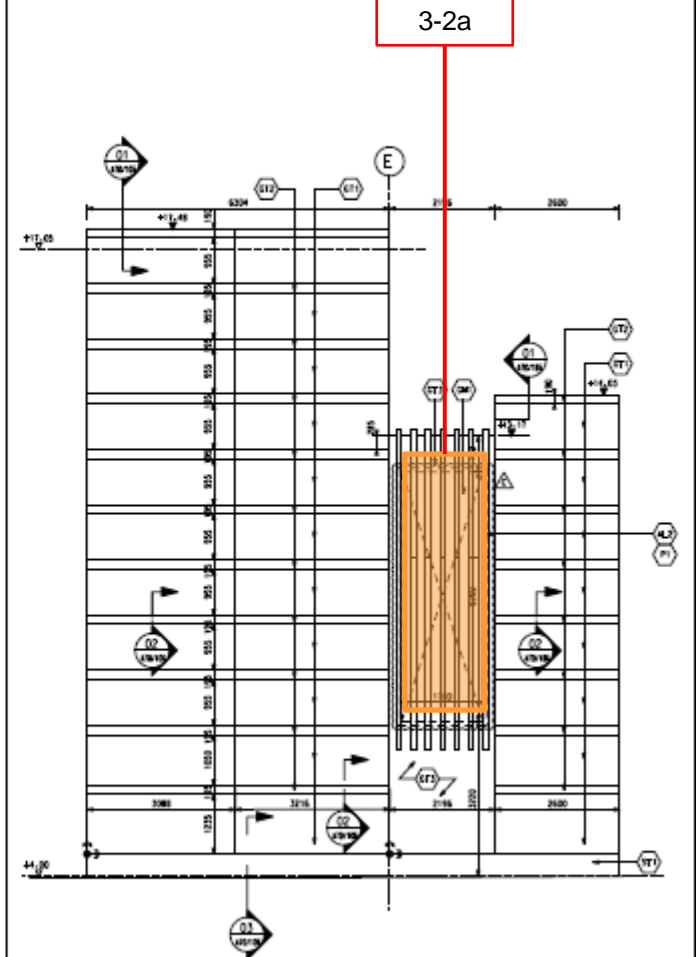
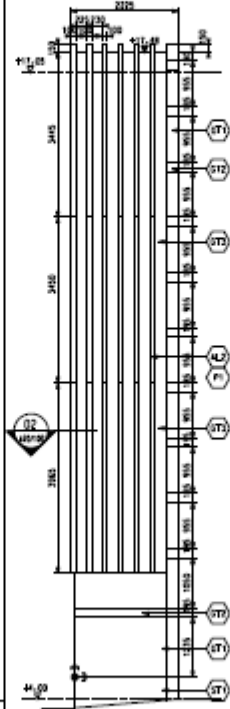
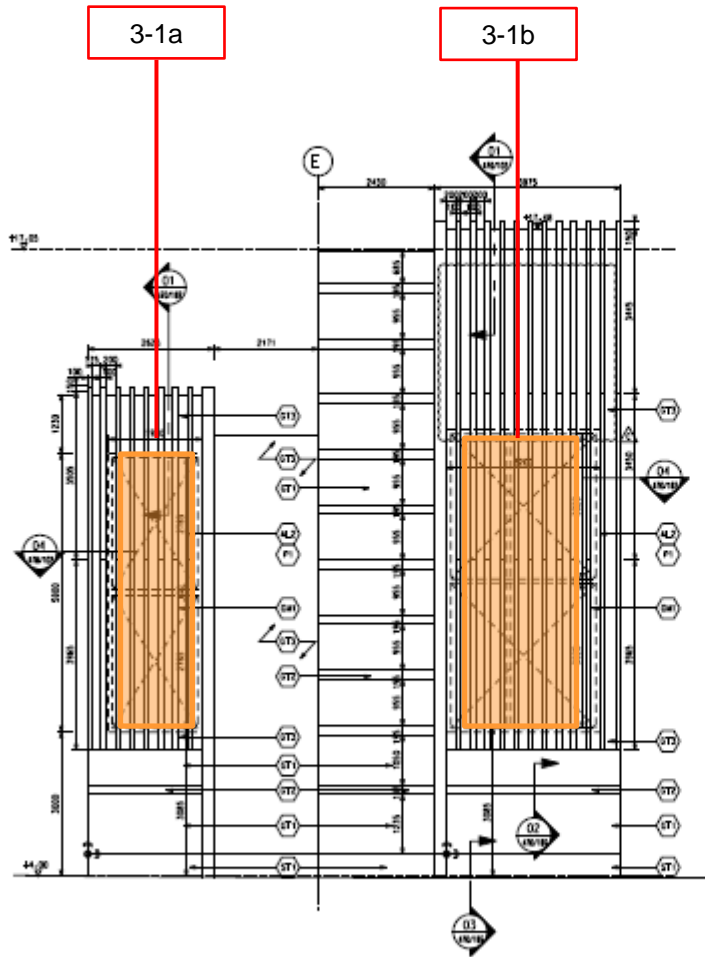
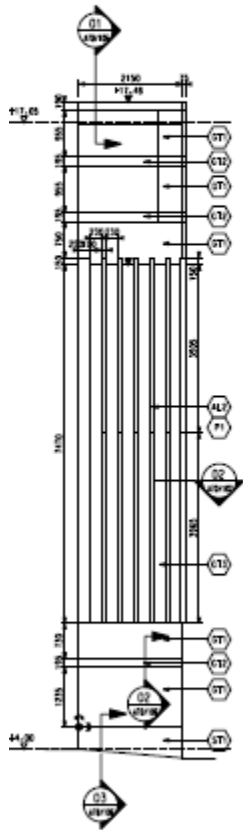
2-3a

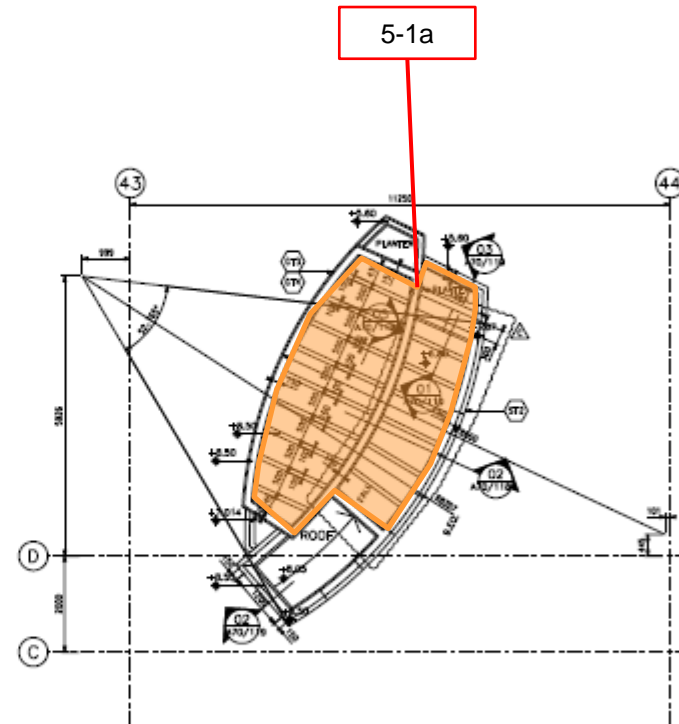
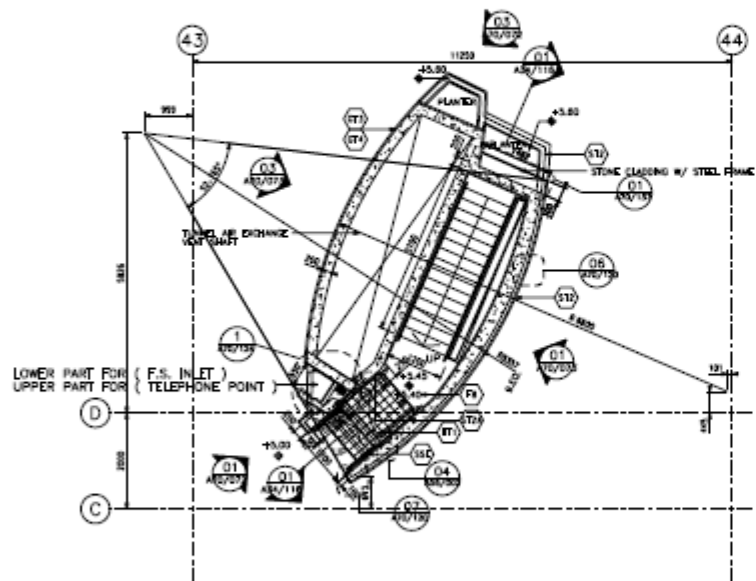
0 500 1000 1500 2000 2500  
METERS  
1 : 50

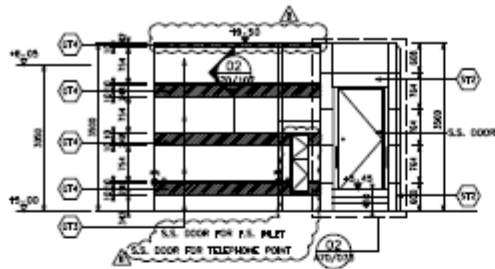






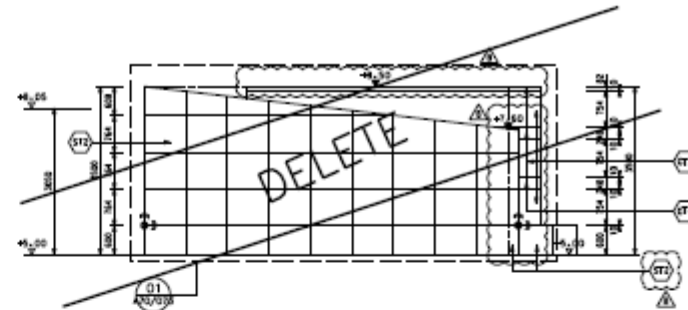






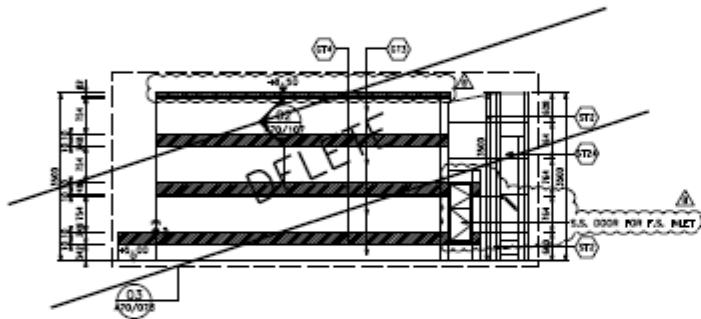
01 ELEVATION:

1 : 50 (A1)  
1 : 100 (A3)



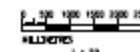
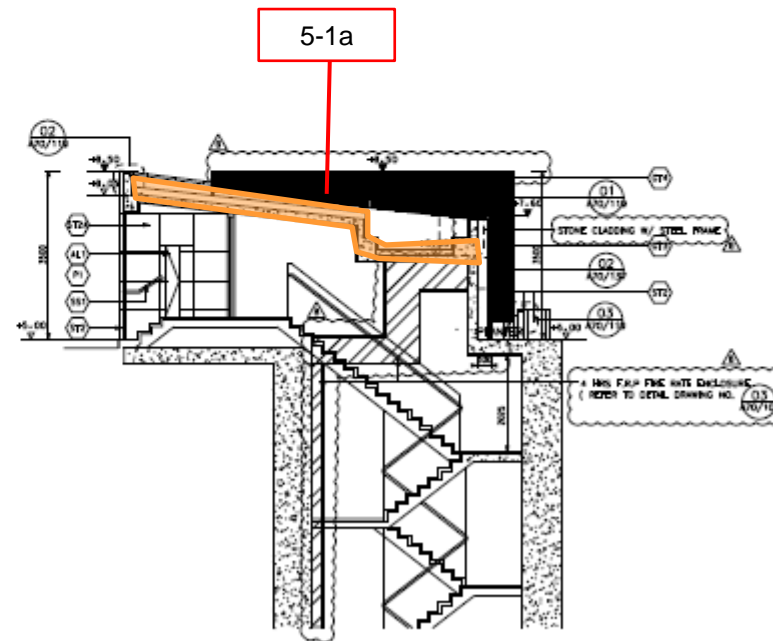
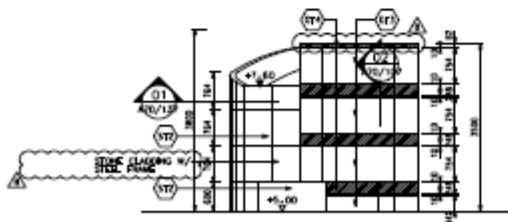
04 ELEVATION:

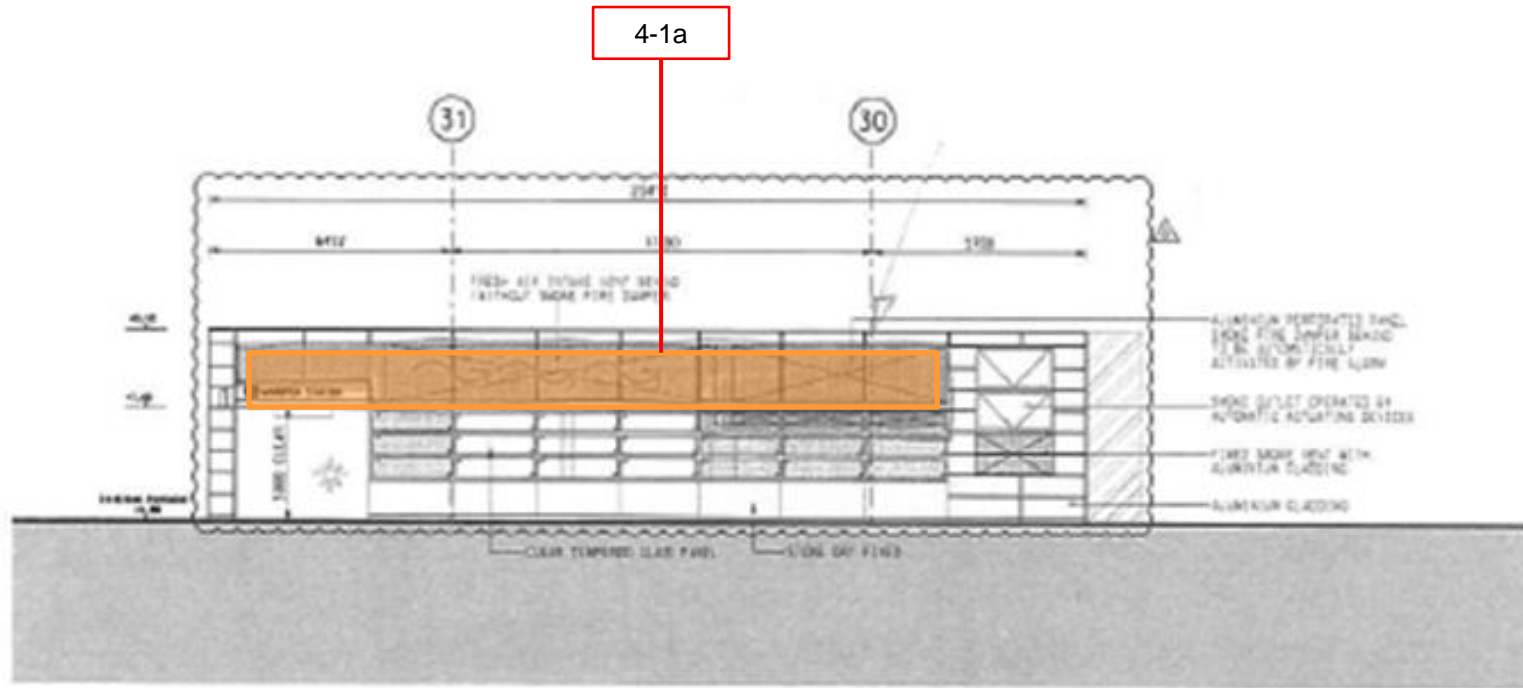
1 : 50 (A1)  
1 : 100 (A3)



02 ELEVATION:

1 : 50 (A1)  
1 : 100 (A3)





Annex A2

## Measurement Methodology





# Methodology of Noise Survey of MTR Contract 1064 Kwun Tong Line Extension

NAP Acoustics (Far East) Ltd.

# Summary of Testing Methodology

Method	Standard	Noise Source	Location of Measurement Point	Minimum Duration of Measurement at Each Point *
Method 2	Developed based on ISO3746:2010	Louvre connected to ventilation duct(s) or a wall mount fan	On parallelepiped surfaces according to approach in ISO3746	1 min
Method 5	Developed based on ISO3746:2010	Other louvre (plant room with cooling towers, pumps, etc.)	On parallelepiped surfaces according to approach in ISO3746	1 min

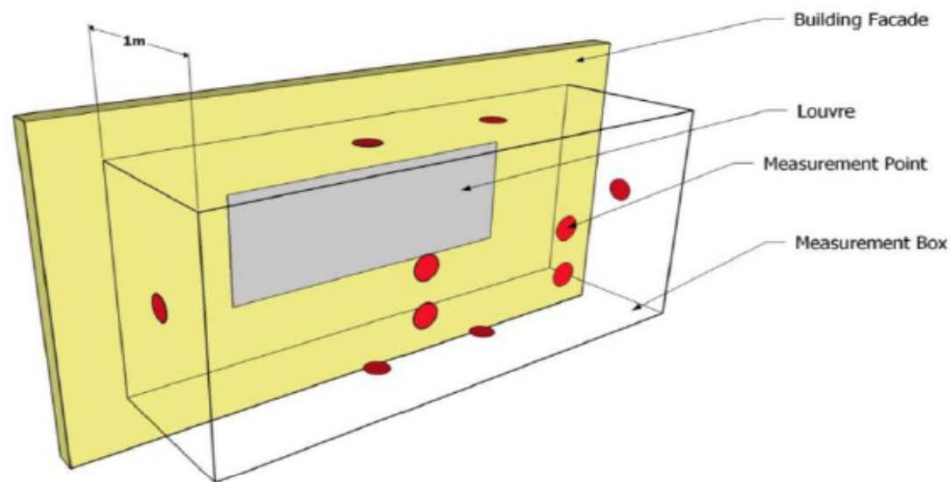
Remarks:

\*According to ISO3746:2010, the measurement time interval shall be at least 10 second. For KTE fixed plant noise SWL measurement, measurement duration of 1 min is adopted.



## Method 2 – Near Field Testing Method for Louvre connected to Ventilation Duct(s) or a wall mount fan

Distance between louvre and each measurement surface (measured from the centre of the louvre or its nearest edge as appropriate),  $d = 1.0\text{m}$  (unless otherwise specified)



For Method 2 (developed based on the principle of ISO3746 –2010),

- First step is to determine a hypothetical measurement surfaces.
- For louvre with largest dimension  $\leq 3.0\text{m}$ , at least one measurement at the centre of the measurement surface parallel to the louvre should be conducted.
- Extra localized microphone positions on the measurement surfaces in the region of high radiation should be considered. In this case follow the procedures of ISO 3744.
- For louvre with largest dimension  $>3.0\text{m}$ , measurement surface and measurement position should follow ISO3746.
- Background noise level (BGL) should be taken at each measurement point for determining the background correction (K1A).
- If the difference between the BGL and the measured noise level (MNL) is less than 3.0 dB, K1A should be capped to 3.0dB.
- If necessary to obtain less conservative results,  $d$  should be reduced according to ISO3746 to obtain higher MNLs.
- If  $d = 0.15\text{m}$  and there is still a need to obtain less conservative results, BGL shall be reduced. This may be achieved by installing noise screen or other measures as appropriate to each particular situation.

$$SWL = \text{Mean } L_{Aeq1min} \text{ over all measurement points} + 10 \log (\text{total surface area over the measurement box}) + K1A + K2A$$

K1A refers to background noise correction factor

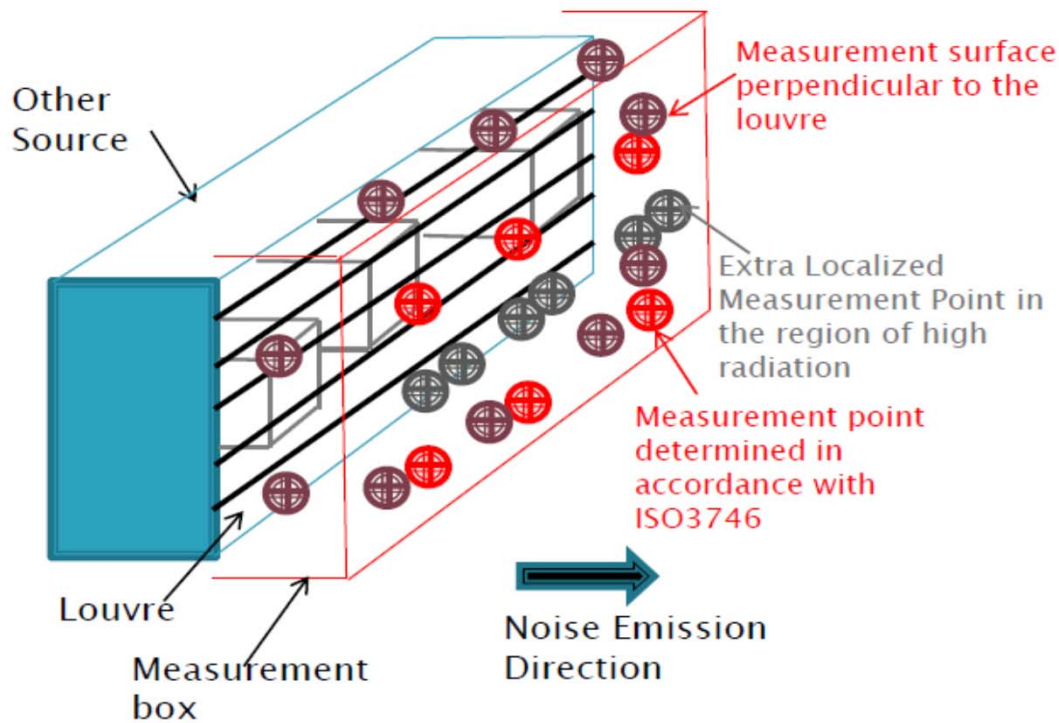
K2A refers to environmental correction for sound absorption and reflection





# Method 5 – Near Field Testing Method for Other Louvre

Distance between louvre and each measurement surface (measured from the centre of the louvre or its nearest edge as appropriate),  $d = 1.0\text{m}$  (unless otherwise specified)



For Method 5 (developed based on the principle of ISO3746 –2010),

- First step is to determine a measurement box.
- Extra localized microphone positions on the measurement surfaces in the region of high radiation should be considered. In this case follow the procedures of ISO 3744.
- Background noise level (BGL) should be taken at each measurement point for determining the background correction (K1A).
- If the difference between the BGL and the measured noise level (MNL) is less than 3.0 dB, K1A should be capped to 3.0dB.
- If necessary to obtain less conservative results,  $d$  should be reduced according to ISO3746 to obtain higher MNLs.
- If  $d = 0.15\text{m}$  and there is still a need to obtain less conservative results, BGL shall be reduced. This may be achieved by installing noise screen or other measures as appropriate to each particular situation.

$$SWL = \text{Mean } L_{Aeq1min} \text{ over all measurement points} + 10 \log (\text{total surface area over the measurement box}) + K1A + K2A$$

K1A refers to background noise correction factor

K2A refers to environmental correction for sound absorption and reflection



Annex A3

## Calibration Certificate

# Certificate of Calibration

**Certificate No.:** 473692154

**Object:** Sound Analyser Nor140

**Supplier:** Norsonic AS

**Type:** Nor140

**Serial number:** 1406038

**Client:** Takabama Limited

**Calibration complies with the following standard(s)**

IEC 61672-1:2002 class 1  
IEC 60651 type 1  
IEC 60804 type 1  
IEC 61260 class 1  
ANSI S1.4-1983 (R2001) with amd. S1.4A-1985 class 1  
ANSI S1.43-1997 (R2002) class 1  
ANSI S1.11-2004 class 1  
DIN 45 657, Applicable parts  
Norsonic production standard set for the Nor140

**Instrumentation used for calibration traceable to:**

Electrical Parameters: MT, Norway  
Acoustical Parameters: PTB, Germany  
Environmental Parameters: IKM, Norway. Justervesenet. Norway

**Adjustments:** None

**Comments:** None

**Date of calibration:** 2014-08-14  
**Calibration interval recommended** 2 years

**The environmental parameters applicable to this calibration are kept well within limits ensuring negligible deviation on obtained measurement results.**

**Calibrated by:**

Sign.    
P.O. BOX 24, N-3420 LIERSKOGEN, NORWAY  
TEL: +47 32 85 89 00





# Calibration Certificate

Certificate No. **607016**

Page 1 of 4 Pages

**Customer :** Supreme Acoustics Research Limited.

**Address :** Rm3915, Hong Kong Plaza, 188 Connaught Road West, Hong Kong

**Order No. :** Q62835

**Date of receipt :** 8-Aug-16

## Item Tested

**Description :** Precision Sound Analyser

**Manufacturer :** Norsonic

**I.D. :** --

**Model :** Nor140

**Serial No. :** 1406038

## Test Conditions

**Date of Test :** 11-Aug-16

**Supply Voltage :** --

**Ambient Temperature :** (23 ± 3)°C

**Relative Humidity :** (50 ± 25) %

## Test Specifications

Calibration check.

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

## Test Results

All results were within the IEC 61672 Type 1 & 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	C147450	SCL-HKSAR
S240	Sound Level Calibrator	601604	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 :**   
Dorothy Cheuk

**Date:** 11-Aug-16

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



# Calibration Certificate

Certificate No. 607016

Page 2 of 4 Pages

Results :

1. Self-generated noise: 17.6 dBA (Mfr's Spec ≤ 18 dBA )

2. Acoustical signal test

UUT Setting				Applied Value (dB)	UUT Reading (dB)
Range (dB)	Frequency Weighting	Time Weighting	Octave Filter		
40-120	A	F	OFF	94.0	93.6
		S	OFF		93.6
	C	F	OFF		93.6
	Z	F	OFF		93.6
	A	F	ON (1/1)		93.6
	A	F	ON (1/3)		93.6
	A	F	OFF		114.0
		S	OFF	113.7	
	C	F	OFF	113.7	
	Z	F	OFF	113.7	
	A	F	ON (1/1)	113.7	
	A	F	ON (1/3)	113.7	

IEC 61672 Type 1 Spec. : ± 1.1 dB

Uncertainty : ± 0.1 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, ± 2 dB
63 Hz	-26.0	- 26.2 dB, ± 1.5 dB
125 Hz	-16.0	- 16.1 dB, ± 1.5 dB
250 Hz	-8.5	- 8.6 dB, ± 1 dB
500 Hz	-3.1	- 3.2 dB, ± 1.4 dB
1 kHz	0.0 (Ref)	0 dB, ± 1.1 dB
2 kHz	+0.9	+ 1.2 dB, ± 1.6 dB
4 kHz	+0.6	+ 1.0 dB, ± 1.6 dB
8 kHz	-0.5	- 1.1 dB, + 2.1 dB ~ -3.1 dB
16 kHz	-5.6	- 6.6 dB, + 3.5 dB ~ - 17.0 dB

Uncertainty : ± 0.1 dB



# Calibration Certificate

Certificate No. 607016

Page 3 of 4 Pages

## 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 Spec.
125 Hz	-74.0	< - 61 dB
250 Hz	-54.5	< - 42 dB
500 Hz	-24.6	< - 17.5 dB
707 Hz	-3.6	- 2 dB ~ - 5 dB
1 kHz (Ref)	--	--
1.414 kHz	-3.8	- 2 dB ~ - 5 dB
2 kHz	-22.6	< - 17.5 dB
4 kHz	-81.0	< - 42 dB
8 kHz	-87.0	< - 61 dB

Uncertainty : ± 0.25 dB



# Calibration Certificate

Certificate No. 607016

Page 4 of 4 Pages

## 5.2 1/3 – Octave Filter

Frequency	Attenuation (dB)	IEC 61260 Class 1 Spec.
326 Hz	-69.7	< - 61 dB
530 Hz	-48.3	< - 42 dB
772 Hz	-22.1	< - 17.5 dB
891 Hz	-3.5	+ 0.3 dB ~ - 5.0 dB
1 kHz (Ref)	--	--
1.122 kHz	-3.5	+ 0.3 dB ~ - 5.0 dB
1.296 kHz	-45.1	< - 17.5 dB
1.887 kHz	-67.3	< - 42 dB
3.070 kHz	-84.5	< - 61 dB

Uncertainty :  $\pm 0.25$  dB

- Remarks :
1. UUT : Unit-Under-Test
  2. The uncertainty claimed is for a confidence probability of not less than 95%.
  3. Atmospheric Pressure : 1007 hPa.
  4. Preamplifier model : 1209 , S/N : 20087
  5. Firmware Version: 3.0.1793
  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. **506098**

Page 1 of 4 Pages

**Customer** : Supreme Acoustics Research Limited.

**Address** : Rm3915, Hong Kong Plaza, 188 Connaught Road West, Hong Kong

**Order No.** : Q52062

**Date of receipt** : 15-Jul-15

## Item Tested

**Description** : Sound Level Meter (SLM No.1)

**Manufacturer** : Larson Davis

**Model** : 831

**Serial No.** : 0002594

## Test Conditions

**Date of Test** : 31-Jul-15

**Supply Voltage** : --

**Ambient Temperature** : (23 ± 3)°C

**Relative Humidity** : (50 ± 25) %

## Test Specifications

Calibration check.

Ref. Document/Procedure: Z01,IEC651, IEC 804, IEC 1260.

## Test Results

All results were within the IEC 651 Type 1, IEC 804 Type 1 & IEC 1260 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	C147450	SCL-HKSAR
S205	Ref. Sound Level Calibrator	PA150015	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).

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

Calibrated by :   
Dorothy Cheuk

Approved by :   
Steve Kwan

Date: 31-Jul-15

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



# Calibration Certificate

Certificate No. **506098**

Page 2 of 4 Pages

Results :

## 1. SPL

UUT Setting				Applied Value (dB)	UUT Reading (dB)
Range	Freq. Wgt.	Time Const.	Center Freq.		
20 - 140	A (SPL)	Fast	--	94.0	94.0
		Slow	--		94.0
	C (SPL)	Fast	--	94.0	94.0
	Z (SPL)	Fast	--	94.0	94.0
	A (SPL)	Fast	--	114.0	114.0
		Slow	--		114.0
	C (SPL)	Fast	--	114.0	114.0
	Z (SPL)	Fast	--	114.0	114.0
	--	1/1 – Oct/Fast	1 kHz	94.0	94.0
				114.0	114.0
	--	1/3 – Oct/Fast	1 kHz	94.0	94.0
				114.0	114.0

IEC 651 Type 1 Spec. :  $\pm 0.7$  dB

Uncertainty :  $\pm 0.2$  dB

## 2. Level Stability : 0.0 dB

IEC 651 Type 1 Spec. :  $\pm 0.3$  dB

Uncertainty :  $\pm 0.01$  dB

## 3. Linearity

### 3.1 Level Linearity

UUT Range (dB)	Applied Value (dB)	UUT Rdg (dB)	Variation (dB)	IEC 651 Type 1 Spec. (Primary Indicator Range)
140	114.0	114.1	+ 0.1	$\pm 0.7$ dB
130	104.0	104.0	0.0	
120	94.0	94.0(Ref.)	--	
110	84.0	84.0	0.0	
100	74.0	74.0	0.0	
90	64.0	63.8	- 0.2	
80	54.0	53.9	- 0.1	

Uncertainty :  $\pm 0.1$  dB



# Calibration Certificate

Certificate No. **506098**

Page 3 of 4 Pages

## 3.2 Differential level linearity

UUT Range (dB)	Applied Value (dB)	UUT Rdg (dB)	Variation (dB)	IEC 651 Type 1 Spec.
120	84.0	84.0	0.0	± 0.4 dB
	94.0	94.0 (Ref.)	--	
	95.0	95.0	0.0	± 0.2 dB

Uncertainty : ± 0.1 dB

## 4. Frequency Weighting

A weighting

Frequency	Attenuation (dB)	IEC 651 Type 1 Spec.
31.5 Hz	-39.5	- 39.4 dB, ± 1.5 dB
63 Hz	-26.3	- 26.2 dB, ± 1.5 dB
125 Hz	-16.2	- 16.1 dB, ± 1 dB
250 Hz	-8.7	- 8.6 dB, ± 1 dB
500 Hz	-3.3	- 3.2 dB, ± 1 dB
1 kHz (Ref)	--	0 dB, ± 1 dB
2 kHz	+1.2	+ 1.2 dB, ± 1 dB
4 kHz	+1.0	+ 1.0 dB, ± 1 dB
8 kHz	-1.2	- 1.1 dB, + 1.5 dB ~ -3 dB
16 kHz	-6.7	- 6.6 dB, + 3 dB ~ - ∞

Uncertainty : ± 0.1 dB

## 5. Time Averaging

Applied Burst duty Factor	Applied Leq Value (dB)	UUT Reading (dB)	IEC 804 Type 1 Spec.
continuous	40.0	40.0	--
1/10	40.0	39.9	± 0.5 dB
1/10 <sup>2</sup>	40.0	39.9	
1/10 <sup>3</sup>	40.0	39.9	± 1.0 dB
1/10 <sup>4</sup>	40.0	39.9	

Uncertainty : ± 0.1 dB



# Calibration Certificate

Certificate No. 506098

Page 4 of 4 Pages

## 6. Filter Characteristics

### 6.1 1/1 – Octave Filter

Frequency	Attenuation (dB)	IEC 1260 Class 1 Spec. (dB)
125 Hz	-69.1	< - 61
250 Hz	-66.0	< - 42
500 Hz	-54.9	< - 17.5
707 Hz	-3.2	- 2 ~ - 5
1 kHz (Ref)	--	--
1.414 kHz	-3.2	- 2 ~ - 5
2 kHz	-65.0	< - 17.5
4 kHz	-70.3	< - 42
8 kHz	-71.0	< - 61

Uncertainty :  $\pm 0.25$  dB

### 6.2 1/3 – Octave Filter

Frequency	Attenuation (dB)	IEC 1260 Class 1 Spec.(dB)
326 Hz	-70.7	< - 61
530 Hz	-62.3	< - 42
772 Hz	-66.2	< - 17.5
891 Hz	-3.0	+ 0.3 ~ - 5.0
1 kHz (Ref)	--	--
1.122 kHz	-2.8	+ 0.3 ~ - 5.0
1.296 kHz	-73.2	< - 17.5
1.887 kHz	-66.2	< - 42
3.070 kHz	-74.4	< - 61

Uncertainty :  $\pm 0.25$  dB

- Remarks:
1. UUT : Unit-Under-Test
  2. The uncertainty claimed is for a confidence probability of not less than 95%.
  3. Atmospheric Pressure : 1 000 hPa

----- END -----



# Calibration Certificate

Certificate No. **506099**

Page 1 of 4 Pages

**Customer :** Supreme Acoustics Research Limited.

**Address :** Rm3915, Hong Kong Plaza, 188 Connaught Road West, Hong Kong

**Order No. :** Q52062

**Date of receipt :** 15-Jul-15

## Item Tested

**Description :** Precision Integrating Sound Level Meter

**Manufacturer :** ONO SOKKI

**Model :** LA-5111

**Serial No. :** 24200127

## Test Conditions

**Date of Test :** 4-Aug-15

**Supply Voltage :** --

**Ambient Temperature :** (23 ± 3)°C

**Relative Humidity :** (50 ± 25) %

## Test Specifications

Calibration check.

Ref. Document/Procedure : Z01.

## Test Results

All results were within the manufacturer's 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	C147450	SCL-HKSAR
S205	Ref. Sound Level Calibrator	PA150015	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).  
The test results apply to the above Unit-Under-Test only

**Calibrated by :**   
Dorothy Cheuk

**Approved by :**   
Steve Kwan

**Date:** 4-Aug-15



# Calibration Certificate

Certificate No. **506099**

Page 2 of 4 Pages

Results :

## 1. SPL Accuracy

UUT Setting				Applied Value (dB)	UUT Reading (dB)
Level Range	Octave Filter	Frequency Weighting	Dynamic Characteristic		
40 – 100 dB	OFF	A	FAST	94.0	94.0
			SLOW		94.0
		C	FAST		94.0
		P	FAST		94.0
	1/1	A	FAST		94.0
	1/3	A	FAST		94.0
60 – 120 dB	OFF	A	FAST	94.0	94.0
	1/1	A	FAST		94.0
	1/3	A	FAST		94.0
	OFF	A	FAST	114.0	114.1
			SLOW		114.1
		C	FAST		114.0
		P	FAST		114.0
	1/1	A	FAST	114.0	
1/3	A	FAST	114.0		

IEC 651 Type 1 Spec. :  $\pm 0.7$  dB

Uncertainty :  $\pm 0.1$  dB

## 2. Level Stability : 0.0 dB

IEC 651 Type 1 Spec. :  $\pm 0.3$  dB

Uncertainty :  $\pm 0.01$  dB

## 3. Linearity

### 3.1 Level Linearity

UUT Range	Applied Value (dB)	UUT Rdg (dB)	Variation (dB)	IEC 651 Type 1 Spec. (Primary Indicator Range)
130	114.0	114.0	0.0	$\pm 0.7$ dB
130	104.0	104.0	0.0	
120	94.0	94.0 (Ref.)	- -	
110	84.0	84.0	0.0	
100	74.0	74.0	0.0	
90	64.0	64.0	0.0	
80	54.0	54.0	0.0	

Uncertainty :  $\pm 0.1$  dB





# Calibration Certificate

Certificate No. **506099**

Page 3 of 4 Pages

## 3.2 Differential level linearity

UUT Range	Applied Value (dB)	UUT Rdg (dB)	Variation (dB)	IEC 651 Type 1 Spec.
120	84.0	84.0	0.0	± 0.4 dB
	94.0	94.0 (Ref.)	--	
	95.0	95.0	0.0	± 0.2 dB
	104.0	113.9	-0.1	± 0.3 dB
	105.0	104.9	-0.1	± 1.0 dB

Uncertainty : ± 0.1 dB

## 4. Frequency Weighting

A weighting

Frequency	Attenuation (dB)	IEC 651 Type 1 Spec.
31.5 Hz	-40.0	- 39.4 dB, ± 1.5 dB
63 Hz	-26.5	- 26.2 dB, ± 1.5 dB
125 Hz	-16.3	- 16.1 dB, ± 1 dB
250 Hz	-8.7	- 8.6 dB, ± 1 dB
500 Hz	-3.3	- 3.2 dB, ± 1 dB
1 kHz	0.0 (Ref.)	0 dB, ± 1 dB
2 kHz	+1.2	+ 1.2 dB, ± 1 dB
5 kHz	+0.5	+ 1.0 dB, ± 1 dB
8 kHz	-1.3	- 1.1 dB, + 1.5 dB ~ - 3 dB
16 kHz	-6.8	- 6.6 dB, + 3 dB ~ - ∞

Uncertainty : ± 0.1 dB

## 5. Time Averaging

Applied Burst duty Factor	Applied Leq Value (dB)	UUT Reading (dB)	IEC 804 Type 1 Spec.
continuous	40.0	40.0	--
1/10	40.0	39.9	± 0.5 dB
1/10 <sup>2</sup>	40.0	39.9	
1/10 <sup>3</sup>	40.0	39.9	± 1.0 dB
1/10 <sup>4</sup>	40.0	39.8	

Uncertainty : ± 0.1 dB



# Calibration Certificate

Certificate No. **506099**

Page 4 of 4 Pages

## 6. Filter Characteristics

### 6.1 1/1 – Octave Filter

Frequency	Attenuation (dB)	IEC 1260 Class 1 Spec. (dB)
125 Hz	-62.9	< - 61
250 Hz	-43.6	< - 42
500 Hz	-43.6	< - 17.5
707 Hz	-3.0	- 2 ~ - 5
1 kHz (Ref)	--	--
1.414 kHz	-3.1	- 2 ~ - 5
2 kHz	-19.8	< - 17.5
4 kHz	-44.4	< - 42
8 kHz	-64.9	< - 61

Uncertainty :  $\pm 0.25$  dB

### 6.2 1/3 – Octave Filter

Frequency	Attenuation (dB)	IEC 1260 Class 1 Spec. (dB)
326 Hz	-64.1	< - 61
530 Hz	-46.1	< - 42
772 Hz	-21.4	< - 17.5
891 Hz	-3.1	+ 0.3 ~ - 5.0
1 kHz (Ref)	--	--
1.122 kHz	-3.0	+ 0.3 ~ - 5.0
1.296 kHz	-21.4	< - 17.5
1.887 kHz	-45.7	< - 42
3.070 kHz	-80.0	< - 61

Uncertainty :  $\pm 0.25$  dB

Remarks : 1. UUT : Unit-Under-Test

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

3. Atmospheric Pressure : 998 hPa.

----- END -----





The Government of  
The Hong Kong Special Administrative Region  
香港特別行政區政府

**Standards  
and Calibration  
Laboratory**  
**標準及校正實驗室**





The Government of  
The Hong Kong Special Administrative Region  
Standards and Calibration Laboratory  
香港特別行政區政府標準及校正實驗所

Certificate of Calibration  
校正證書



Certificate No. PA150145  
證書編號

Page 1 of 6 pages  
第 頁 (共 頁)

Customer / 客戶

Supreme Acoustics Research Limited  
Room 3915, Hong Kong Plaza,  
Connaught Road West,  
Hong Kong

Equipment / 儀器

Description / 名稱

Sound Calibrator

Make / 製造商

Brüel & Kjær

Model / 型號

4231

Serial No. / 序號

2571861

Date of Receipt / 收件日期

10 September 2015

Test Environment / 測試環境

Temperature / 溫度

(23 ± 1) °C

Relative Humidity / 相對濕度

(45 ± 8) %

Air Pressure / 氣壓

(99.4 to 99.5) kPa

Date of Test / 測試日期

11 September 2015

Test Specifications / 測試規格

Calibrate the sound pressure level, frequency and total distortion  
of the sound calibrator at 94 dB and 114 dB in accordance with the  
International Standard IEC 60942 : 2003 Annex B.

Test Results / 測試結果

The results are detailed in the continuation pages.

Approved Signatory Lam Hoi Shan  
批簽 *Brenda Lam*

Date: 16 September 2015  
日期

Hong Kong Accreditation Service (HKAS) has accredited this laboratory (Reg. No. HOKLAS 051) under the Hong Kong Laboratory Accreditation Scheme (HOKLAS) for specific calibration activities as listed in the HOKLAS directory of accredited laboratories. The results shown in this certificate are metrologically traceable to the International System of Units (S.I.) or recognised measurement standards.  
香港認可處已根據香港實驗所認可計劃，認可本實驗所 (Reg. No. HOKLAS 051) 進行《認可實驗所所名冊》內載列的指定活動。本證書所載結果可溯源至國際單位制或公認的計量標準。

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Branch Laboratory : G04, Public Works Central Laboratory Building, 2B Cheung Yip Street, Kowloon Bay, Kowloon.  
總所：香港灣仔告士打道 7 號入境事務大樓 36 樓  
分所：九龍九龍灣祥業街 2 號 B 工務中央試驗所大樓地下 04 室

Tel : 2829 4830  
Tel : 2798 7347

M009439



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Standards and Calibration Laboratory  
香港特別行政區政府標準及校正實驗所

**Certificate of Calibration** (Continuation Page)  
**校正證書** (續頁)

Certificate No. PA150145  
證書編號

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1. The test equipment was allowed to stabilise in the laboratory environment at 23 °C and 45 % RH for over 24 hours before the test.
2. The power supply to the instrument under test was two 1.5 V batteries.
3. Procedures from IEC 60942 : 2003 Annex B were used to perform the calibration, which included the following tests :

(1) Sound pressure level

Performance tests were carried out in accordance with Section B.3.4 of IEC 60942 : 2003. The sound pressure level generated by the B & K 4231 was measured by a laboratory B & K 4180 standard microphone. Measurement results are presented in Table 1.


(2) Frequency


Relevant tests were carried out in accordance with Section B.3.5 of IEC 60942 : 2003. The frequency of the acoustic signal was measured by a frequency counter. Measurement results are presented in Table 2.

(3) Total distortion

Relevant tests were carried out in accordance with Section B.3.6 of IEC 60942 : 2003. The distortion of the acoustic signal was measured by a distortion meter. Measurement results are presented in Table 3.

4. No adjustment was made to the instrument under test.

Calibrated by :   
Y.C. Kwan

Checked by :   
H.S. Lam

Date : 16 September 2015

Date : 16 September 2015





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Standards and Calibration Laboratory  
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**校正證書** (續頁)


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證書編號

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5. The Sound Calibrator has been shown to conform to the class 1 requirements for periodic testing, described in Annex B of IEC 60942 : 2003 for the sound pressure level, frequency and total distortion stated, for the environmental conditions under which the tests were performed. However, as public evidence was not available, from a testing organization responsible for pattern approval, to demonstrate that the model of sound calibrator conformed to the requirements for pattern evaluation described in Annex A of IEC 60942 : 2003, no general statement or conclusion can be made about conformance of the sound calibrator to the requirements of IEC 60942 : 2003.
6. The measurement uncertainty evaluation has been carried out in accordance with principles in the Evaluation of Measurement Data – Guide to the Expression of Uncertainty in Measurement, JCGM 100:2008. The expanded measurement uncertainty  $U$ , with its coverage factor  $k$ , corresponds to a 95 % probability that the value of the measurand  $Y$  lies within the interval  $y-U$  to  $y+U$ . The combined standard measurement uncertainty  $u_c$  can be calculated as  $u_c = U/k$  and its degrees of freedom  $\nu_{\text{eff}}$  is given by the  $t$ -distribution with the respective  $k$  value.
7. The values given in this Certificate of Calibration only relate to the values measured at the time of the test and any measurement uncertainties quoted will not include allowances for the equipment long term drift, variations with environmental changes, vibration and shock during transportation, or the capability of any other laboratory to repeat the measurement.
8. This certificate is consistent with the capabilities that are included in Appendix C of the MRA drawn up by the CIPM. Under the MRA, all participating institutes recognise the validity of each other's calibration and measurement certificates for the quantities, ranges and measurement uncertainties specified in Appendix C (for details see <http://www.bipm.org>).

CIPM : International Committee for Weights and Measures  
MRA : Mutual Recognition Arrangement

Calibrated by :   
Y.C. Kwan

Checked by :   
H.S. Lam

Date : 16 September 2015

Date : 16 September 2015



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Standards and Calibration Laboratory  
香港特別行政區政府標準及校正實驗所

**Certificate of Calibration** (Continuation Page)  
**校正證書** (續頁)

Certificate No. PA150145  
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第 頁 (共 頁)


Table 1


Sound Pressure Level Test Results

B&K 4231 Sound Pressure Level Setting	Measured Sound Pressure Level <sup>(1)</sup>		
	Value $y$	Measurement Uncertainty	
		Expanded Measurement Uncertainty $U$	Coverage Factor $k$
94 dB	93.97 dB	0.06 dB	2.0
114 dB	113.96 dB	0.06 dB	2.0

Note (1): Measurement results at measurement conditions were corrected to the following reference conditions :

Temperature : 23 °C  
Humidity : 50 % RH  
Pressure : 101.325 kPa

Calibrated by :   
Y.C. Kwan

Checked by :   
H.S. Lam

Date : 16 September 2015

Date : 16 September 2015



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**校正證書** (續頁)

Certificate No. PA150145  
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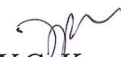
Page 5 of 6 pages  
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Table 2

Frequency Test Results<sup>(1)</sup>

B&K 4231 Sound Pressure Level Setting	Measured Frequency		
	Value $y$	Measurement Uncertainty	
		Expanded Measurement Uncertainty $U$	Coverage Factor $k$
94 dB	999.966 Hz	0.010 Hz	2.0
114 dB	999.966 Hz	0.010 Hz	2.0

Note (1) : Items not supported by CIPM MRA.

Calibrated by :   
Y.C. Kwan

Checked by :   
H.S. Lam

Date : 16 September 2015

Date : 16 September 2015





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
Table 3


Total Distortion Test Results<sup>(1)</sup>

B&K 4231 Sound Pressure Level Setting	Measured Total Distortion		
	Value $y$	Measurement Uncertainty	
		Expanded Measurement Uncertainty $U$	Coverage Factor $k$
94 dB	0.5 %	0.5 %	2.0
114 dB	0.2 %	0.5 %	2.0

Note (1) : Items not supported by CIPM MRA.

- END -

Calibrated by :   
Y.C. Kwan

Checked by :   
H.S. Lam

Date : 16 September 2015

Date : 16 September 2015

Annex A4

## Sample Photographs showing Measurement Locations

Annex A4a

Sample Photographs  
showing Measurement  
Locations (WAB)



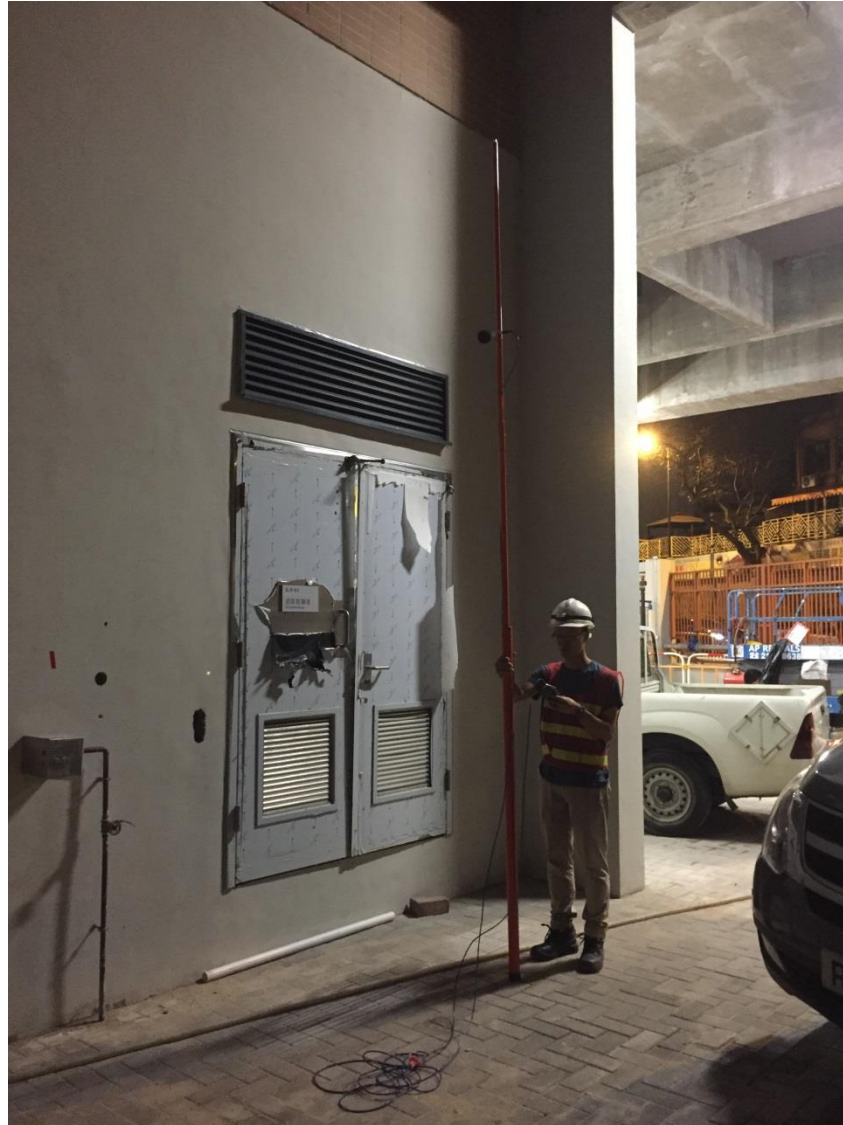
Annex A4a-1

Measurement Location at VSWAB-1

DATE: 20/07/2016

Environmental  
Resources  
Management





Annex A4a-2

Measurement Location at VSWAB-7

DATE: 20/07/2016

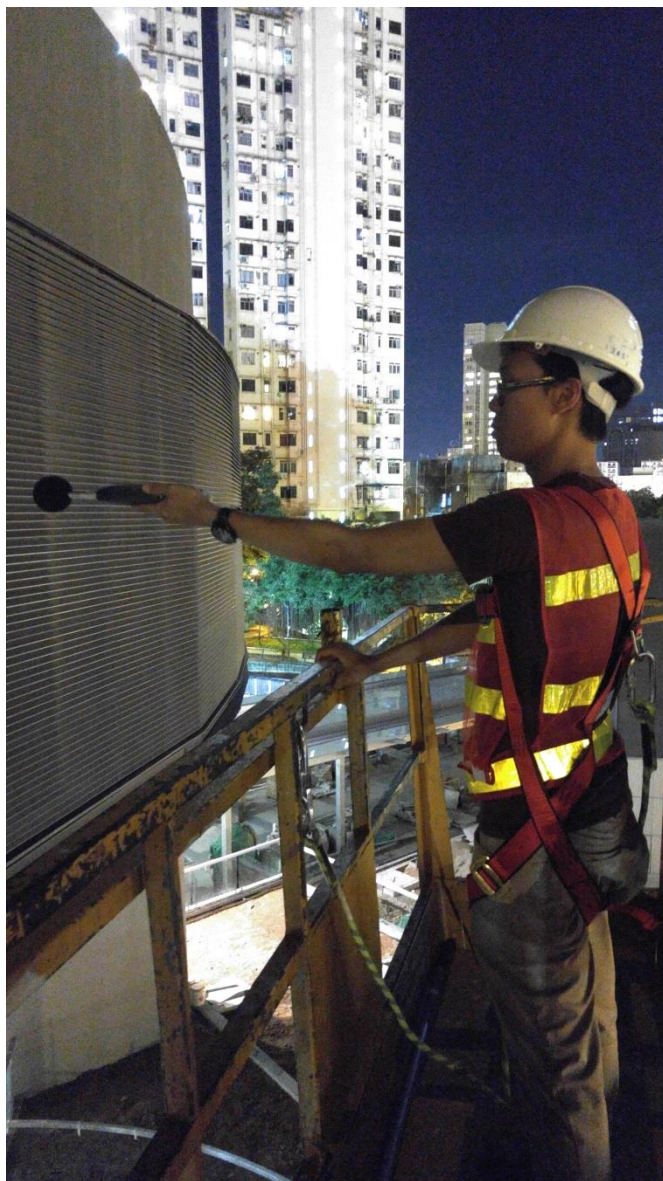
Environmental  
Resources  
Management



Annex A4b

Sample Photographs  
showing Measurement  
Locations (HOM)





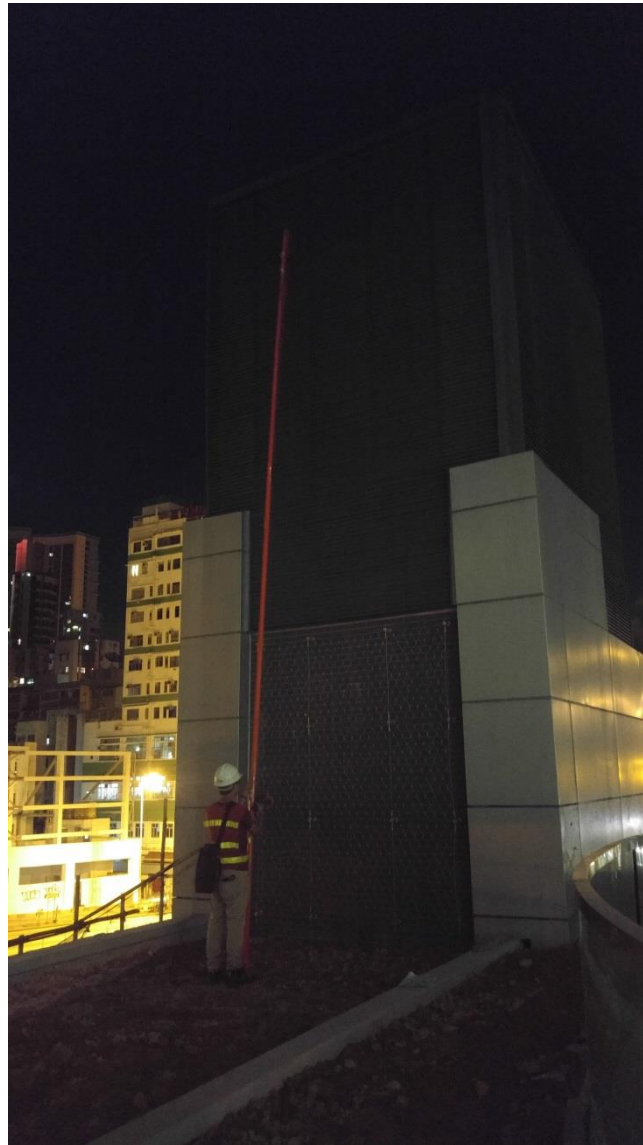
Annex A4b-1

Measurement Location at D1

DATE: 26/08/2016

Environmental  
Resources  
Management





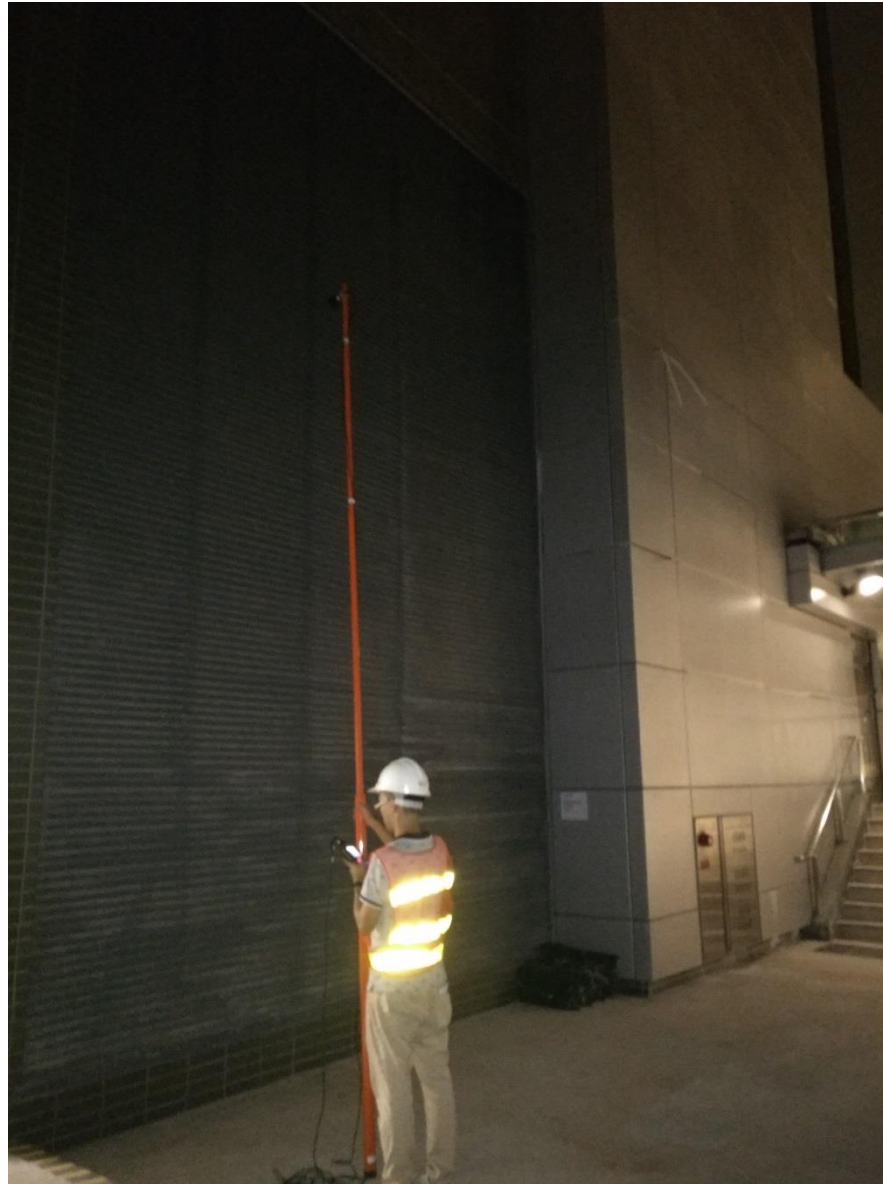
Annex A4b-2

Measurement Location at H2

DATE: 26/08/2016

Environmental  
Resources  
Management





Annex A4b-3

Measurement Location at B3a

DATE: 26/08/2016

Environmental  
Resources  
Management





Annex A4b-4

Measurement Location at B5

DATE: 26/08/2016

Environmental  
Resources  
Management







Annex A4b-5

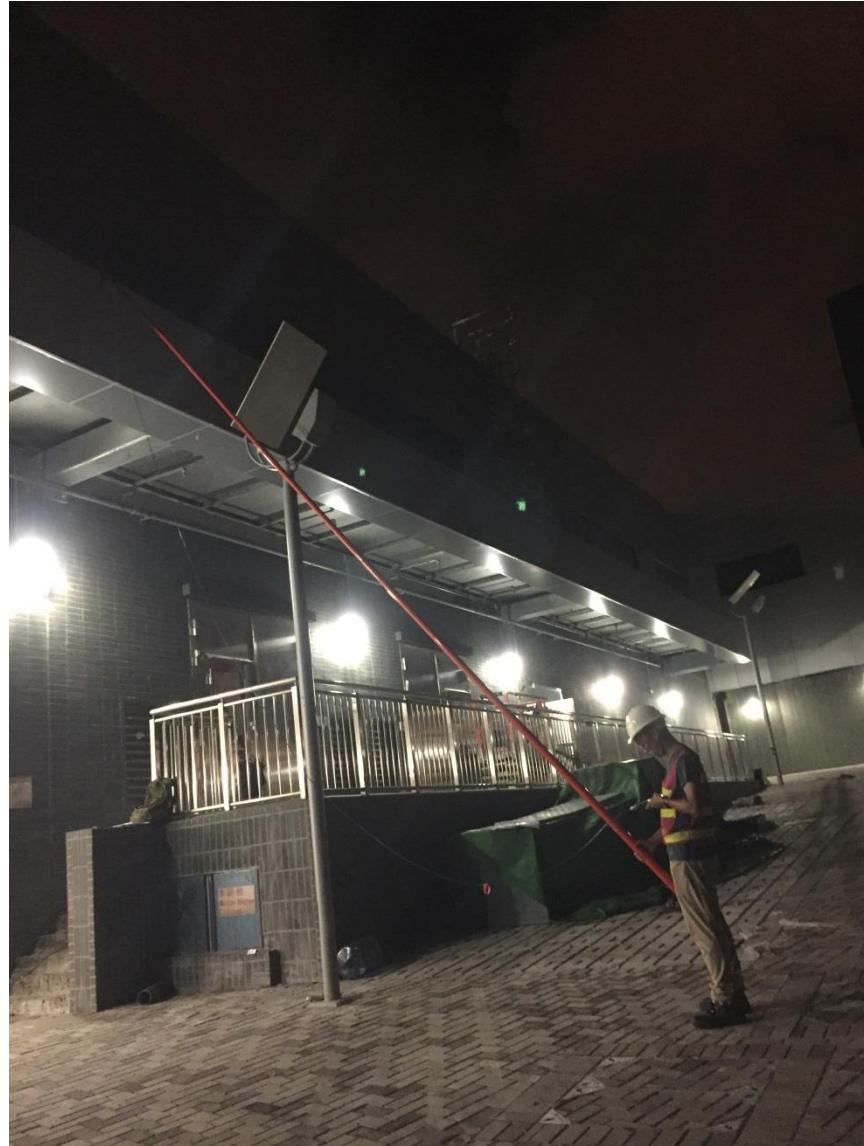
Measurement Location at C6

DATE: 26/08/2016

Environmental  
Resources  
Management







Annex A4b-6

Measurement Location at F1

DATE: 26/08/2016

Environmental  
Resources  
Management



Annex A4c

Sample Photographs  
showing Measurement  
Locations (WHA)



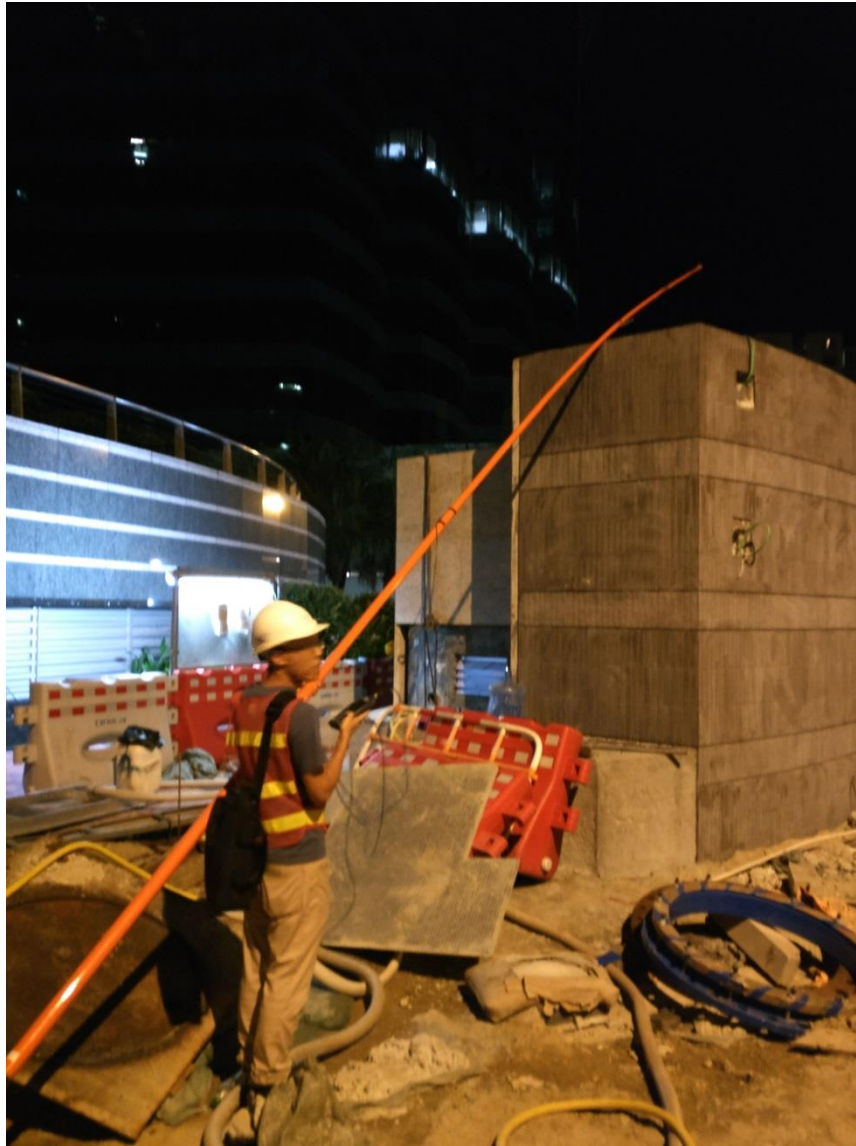
Annex A4c-1

Measurement Location at 3-1b

DATE: 26/08/2016

Environmental  
Resources  
Management





Annex A4c-2

Measurement Location at 5-1a

DATE: 26/08/2016

Environmental  
Resources  
Management







Annex A4c-3

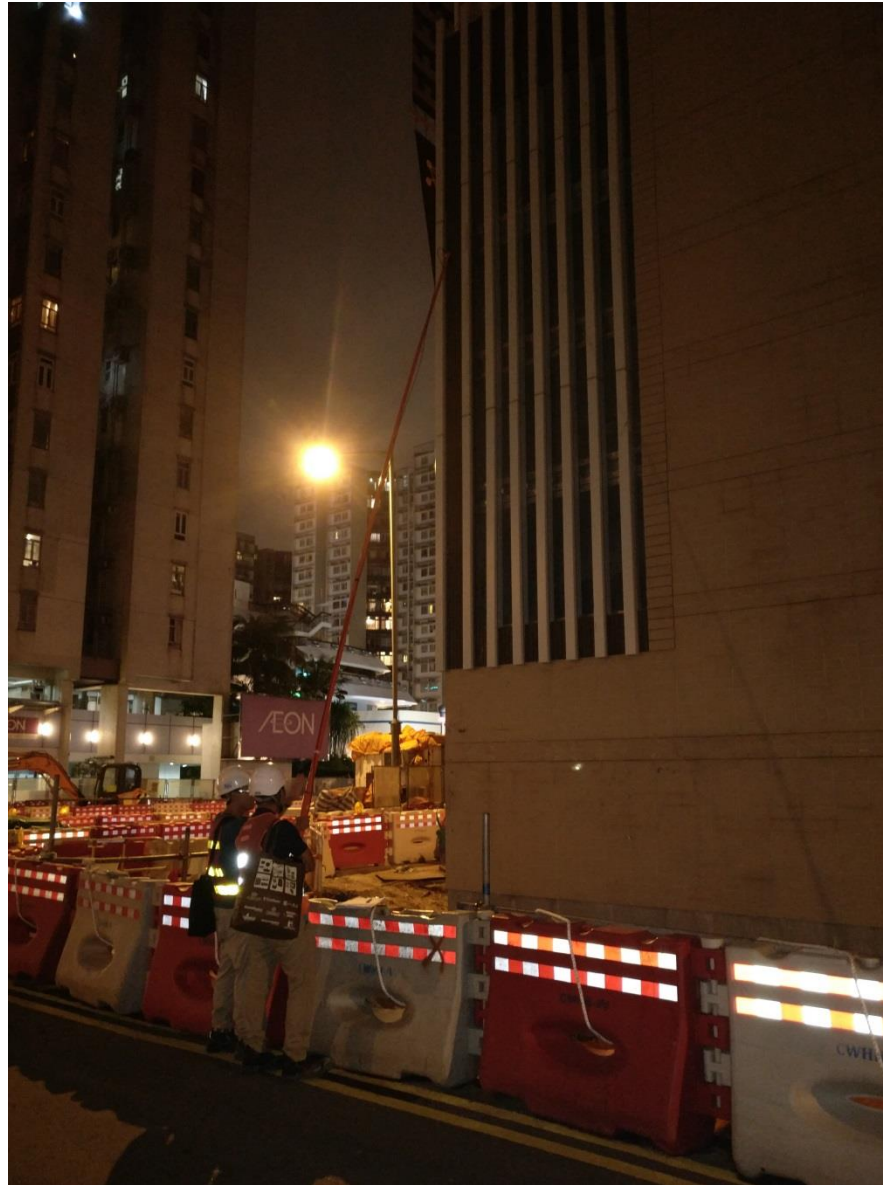
Measurement Location at 2-3a

DATE: 26/08/2016

Environmental  
Resources  
Management







Annex A4c-4

Measurement Location at 3-1a

DATE: 26/08/2016

Environmental  
Resources  
Management





Annex A4c-5

Measurement Location at 1-4a

DATE: 26/08/2016

Environmental  
Resources  
Management



Annex A5

## Detailed Results of the Noise Measurements

## MTR KTE WAB - FPN SWL Measurement Result

Louvre	Louvre size		Measurement Surface Area <sup>(a)</sup> (m <sup>2</sup> )	D [m] <sup>(b)</sup>	Measurement Method <sup>(c)</sup>	Operation Mode <sup>(d) (e) (f) (g)</sup>	Average measured SPL [dB(A)]		BG corrected SPL <sup>(h)</sup>	Calculated SWL <sup>(i)</sup>	SWL (Daytime and Evening) [dB(A)]	SWL (Night-time) [dB(A)]
	Width (m)	Height (m)					L <sub>Aeq</sub> [dB(A)]	Diff. with BG	L <sub>Aeq</sub> [dB(A)]	L <sub>Aeq</sub> [dB(A)]		
VSWAB-1A	1.2	0.9	21.5	1	2	BG	54.8					
						Scenario 2	56.7	1.9	53.7	67.0	67	67
VSWAB-1B	2.4	3.6	44.5	1	2	BG	58.4					
						Scenario 1	79.0	20.6	79.0	95.5	96	-
VSWAB-2	2.5	3.6	45.3	1	2	BG	59.7					
				1		Scenario 2	63.4	3.7	61.0	77.6	-	78
				1		Scenario 1	72.6	12.9	72.6	89.2	89	-
VSWAB-3	2.5	0.8	26.9	1	2	BG	60.3					
				1		Scenario 1	78.7	18.4	78.7	93.0	93	-
VSWAB-4	4.2	0.8	35.0	1	2	BG	60.7					
				1		Scenario 2	69.3	8.6	68.7	84.1	84	84
VSWAB-5A	3.0	0.9	30.0	1	2	BG	56.3					
				1		Scenario 2	66.5	10.2	66.5	81.3	81	81
VSWAB-5B	3.0	0.9	30.0	1	2	BG	55.7					
				1		Scenario 2	66.2	10.5	66.2	81.0	81	81
VSWAB-6A	3.0	0.9	30.0	1	2	BG	56.2					
				1		Scenario 2	64.0	7.8	63.2	78.0	78	78
VSWAB-6B	3.0	0.9	30.0	1	2	BG	57.4					
				1		Scenario 2	64.2	6.8	63.2	77.9	78	78
VSWAB-7A	1.2	0.5	19.1	1	2	BG	58.8					
				1		Scenario 2	70.2	11.4	70.2	83.0	83	83
VSWAB-7B	1.6	0.5	21.2	1	2	BG	58.8					
				1		Scenario 2	70.7	11.9	70.7	84.0	84	84
VSWAB-10	1.6	0.5	21.2	1	2	BG	57.5					
				1		Scenario 2	66.0	8.5	65.3	78.6	79	79

Remarks:

(a) Measurement Surface Area -

$(W+2D)X(H+2D)+2X(W+2D)+2X(H+2D)$

(b) D -

Measurement distance between louvre and microphone

(c) Measurement Method 2 -

Near Field Testing Method for Louvre connected to Ventilation Duct(s) or a wall mount fan shown in Annex A2

(d) Scenario 1 -

Full capacity of normal operation mode with emergency mode to check against noise criteria during daytime and evening periods

(e) Scenario 2 -

Full capacity of normal operation mode without emergency mode to check against the noise criteria during night-time period

(f) BG -

Background noise

(g) Emergency mode -

Emergency mode only operates during daytime and evening period for regular maintenance

(h) BG corrected SPL -

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

(i) Calculated SWL -

$(\text{refer to Annex A2}) \text{ SWL} = \text{Mean } L_{Aeq1min} \text{ over all measurement points} + 10 \log(\text{total surface area over the measurement box}) + K1A + K2A$

K1A refers to background noise correction factor

K2A refers to environmental correction for sound absorption and reflection

## MTR KTE HOM - FPN SWL Measurement Result

Louvre	Louvre size		Measurement Surface Area <sup>(a)</sup> (m2)	D [m] <sup>(b)</sup>	Measurement Method <sup>(c)</sup>	Operation Mode <sup>(d) (e) (f) (g)</sup>	Average measured SPL [dB(A)]		BG corrected SPL <sup>(h)</sup>	Calculated SWL <sup>(i)</sup>	SWL (Daytime and Evening) [dB(A)]	SWL (Night-time) [dB(A)]
	Width (m)	Height (m)					LAeq [dB(A)]	Diff. with BG	LAeq [dB(A)]	LAeq [dB(A)]		
B3a <sup>(k)</sup>	1.97	6.85	46.95	1	2	BG	61.4					
						Scenario 2	66.9	5.4	65.4	82.1	82	82
B3b <sup>(l)</sup>	2.2	6.85	36.17	1	2	BG	56.0					
						Scenario 2	56.9	0.9	53.9	69.5	-	70
						BG	61.6					
B4	6.8	5.9	102.4	1	2	Scenario 1	67.9	6.3	66.7	82.3	82	-
						BG	69.7					
B4a	3.5	1.5	37.25	1	2	Scenario 1	77.1	7.4	76.2	96.3	96	-
						BG	65.8					
B5 <sup>(m)</sup>	5.65	3.45	30.79	1	2	Scenario 2	68.6	2.8	65.6	81.4	81	81
						BG	64.5					
B6	9.5	3.3	93.9	1	2	Scenario 2	69.0	4.5	67.1	82.0	82	82
						BG	62.8					
B7 <sup>(k)</sup>	4.7	2.9	40.5	1	2	Scenario 1	68.2	5.4	66.7	86.4	86	-
						BG	61.7					
B8	4.7	3.3	58.9	1	2	Scenario 1	69.7	8.0	69.0	85.0	85	-
						BG	61.7					
B9	2.35	2.75	38.86	1	2	Scenario 1	68.0	6.3	66.8	84.5	85	-
						BG	57.3					
B10	2	1.2	27.20	1	2	Scenario 2	58.8	1.5	55.8	71.7	72	72
						BG	56.5					
B11	1.5	0.5	20.75	1	2	Scenario 1	57.5	0.9	54.5	68.8	69	-
						BG	57.4					
C1a	2.5	0.75	26.88	1	2	Scenario 1	57.6	0.2	54.6	67.7	68	-
						BG	66.8					
C1b	6.5	0.75	31.63	0.5	2	Scenario 2	66.1	-0.6	63.1	77.4	77	77
						BG	66.5					
C2a	1	0.75	19.75	1	2	Scenario 2	67.8	1.3	64.8	79.8	80	80
						BG	64.2					
C2b	1	0.75	19.75	1	2	Scenario 2	68.7	4.5	66.7	79.7	80	80
						BG	67.1					
C2c	1.8	0.75	23.55	1	2	Scenario 2	71.1	4.0	68.9	81.9	82	82
						BG	64.2					
C2d	1	0.75	19.75	1	2	Scenario 1	64.8	0.6	61.8	75.5	76	-
						BG	65.9					
C2e	1	0.75	19.75	1	2	Scenario 2	71.2	5.4	69.8	82.7	83	83
						BG	65.2					
C3	6.5	0.75	45.88	1	2	Scenario 2	70.9	5.7	69.6	82.5	83	83
						BG	65.3					
C4 <sup>(k)</sup>	10.15	5.1	84.79	0.5	2	Scenario 2	67.5	2.2	64.5	81.1	81	81
						BG	64.1					
						Scenario 2	63.4	-0.7	60.4	79.7	-	80
						Scenario 1	63.9	-0.2	60.9	80.2	80	-



## MTR KTE HOM - FPN SWL Measurement Result

Louvre	Louvre size		Measurement Surface Area <sup>(a)</sup> (m2)	D [m] <sup>(b)</sup>	Measurement Method <sup>(c)</sup>	Operation Mode <sup>(d) (e) (f) (g)</sup>	Average measured SPL [dB(A)]		BG corrected SPL <sup>(h)</sup>	Calculated SWL <sup>(i)</sup>	SWL (Daytime and Evening) [dB(A)]	SWL (Night-time) [dB(A)]
	Width (m)	Height (m)					LAeq [dB(A)]	Diff. with BG	LAeq [dB(A)]	LAeq [dB(A)]		
C4a	2	2	32.00	1	2	BG	64.9					
						Scenario 2	72.0	7.1	71.0	86.1	86	86
C5 <sup>(j)</sup>	4	2	34.00	1	2	BG	65.4					
						Scenario 2	67.7	2.4	64.7	80.1	80	80
C6 <sup>(j)</sup>	3.9	4	45.20	1	2	BG	64.5					
						Scenario 2	64.8	0.3	61.8	78.3	-	78
						BG	63.2					
Scenario 1	68.3	5.1	66.6	83.2	83	-						
C7c	5.3	1.75	49.48	1	2	BG	63.4					
						Scenario 1	63.8	0.5	60.8	77.8	78	-
D1	10.0	3.0	93.7	1	2	BG	68.9					
						Scenario 2	72.3	3.4	69.6	89.4	89	89
D2	4.0	3.0	51.7	1	2	BG	69.0					
						Scenario 2	72.2	3.2	69.4	86.5	87	87
D3	3.1	3.4	48.54	1	2	BG	67.3					
						Scenario 2	70.1	2.8	67.1	83.9	-	84
						Scenario 1	71.0	3.7	68.0	84.9	85	-
D5	4.3	3.4	57.42	1	2	BG	66.8					
						Scenario 2	68.0	1.3	65.0	82.6	83	83
D6	4.25	3.4	57.05	1	2	BG	65.2					
						Scenario 2	69.5	4.3	67.5	85.1	85	85
D7	4.5	3.4	58.90	1	2	BG	65.1					
						Scenario 2	67.6	2.6	64.6	82.3	82	82
D8	2.9	3.4	47.06	1	2	BG	64.3					
						Scenario 1	65.1	0.8	62.1	78.8	79	-
D9	2.1	3.4	41.14	1	2	BG	63.8					
						Scenario 2	64.1	0.2	61.1	77.2	77	77
D10	3.75	3.4	53.35	1	2	BG	62.3					
						Scenario 2	63.0	0.7	60.0	77.3	-	77
						Scenario 1	65.9	3.6	62.9	80.2	80	-
D11	3	3.4	47.80	1	2	BG	62.7					
						Scenario 2	62.9	0.2	59.9	76.7	77	77
E1	5.75	5.85	73.44	0.5	2	BG	59.7					
						Scenario 2	60.6	0.9	57.6	76.3	76	76
E2	1.75	5.55	36.61	0.5	2	BG	61.2					
						Scenario 2	61.4	0.1	58.4	74.0	74	74
E3	7.65	6	91.85	0.5	2	BG	58.0					
						Scenario 2	58.9	0.9	55.9	75.5	76	76
E4	4.5	4.95	72.08	1	2	BG	57.9					
						Scenario 2	60.7	2.7	57.7	76.2	76	76
E5-1	11.0	2.9	99.5	1	2	BG	57.1					
						Scenario 2	59.2	2.1	56.2	76.2	76	76

## MTR KTE HOM - FPN SWL Measurement Result

Louvre	Louvre size		Measurement Surface Area <sup>(a)</sup> (m <sup>2</sup> )	D [m] <sup>(b)</sup>	Measurement Method <sup>(c)</sup>	Operation Mode <sup>(d) (e) (f) (g)</sup>	Average measured SPL [dB(A)]		BG corrected SPL <sup>(h)</sup>	Calculated SWL <sup>(i)</sup>	SWL (Daytime and Evening) [dB(A)]	SWL (Night-time) [dB(A)]
	Width (m)	Height (m)					LAeq [dB(A)]	Diff. with BG	LAeq [dB(A)]	LAeq [dB(A)]		
F1 <sup>(k)</sup>	6.4	1.3	32.32	1	2	BG	58.4					
						Scenario 1	65.4	7.1	64.5	79.6	80	-
						BG	60.3					
						Scenario 2	61.0	0.7	58.0	73.1	-	73
F1a <sup>(k)</sup>	1	3	16.00	0.5	2	BG	58.6					
						Scenario 2	59.2	0.6	56.2	68.2	68	68
F1b <sup>(k)</sup>	1.2	2.6	15.22	0.5	2	BG	56.7					
						Scenario 2	57.4	0.8	54.4	66.3	66	66
F1c <sup>(k)</sup>	1.3	3.05	17.57	0.5	2	BG	57.5					
						Scenario 2	58.1	0.6	55.1	67.6	68	68
F1d <sup>(k)</sup>	1.28	3	24.40	1	2	BG	62.1					
						Scenario 1	62.1	0.0	59.1	73.0	73	-
F3a	0.6	1	19.00	1	2	BG	59.5					
						Scenario 2	59.0	-0.6	56.0	68.8	69	69
F3b	1.4	1	23.00	1	2	BG	59.2					
						Scenario 2	59.1	-0.1	56.1	69.7	70	70
F3d	0.3	0.4	14.92	1	2	BG	58.2					
						Scenario 2	59.1	0.9	56.1	67.8	68	68
F4a	15.45	2.25	113.31	1	2	BG	55.9					
						Scenario 1	61.3	5.4	59.8	80.4	80	-
F4b	6.6	2.25	46.40	0.5	2	BG	55.3					
						Scenario 2	55.6	0.3	52.6	69.3	-	69
H1	4.0	3.0	52.0	1	2	BG	70.3					
						Scenario 1	75.4	5.1	73.8	91.0	91	-
H2	3.0	3.0	45.0	1	2	BG	66.9					
						Scenario 1	75.5	8.6	74.9	91.4	91	-
H3	4.0	3.0	52.0	1	2	BG	66.7					
						Scenario 1	74.3	7.6	73.5	90.6	91	-
H4	3.0	3.0	45.0	1	2	BG	69.9					
						Scenario 1	74.0	4.1	71.9	88.4	88	-
I1	4.0	3.0	52.0	1	2	BG	71.5					
						Scenario 1	76.3	4.8	74.6	91.7	92	-
I2	3.0	3.0	45.0	1	2	BG	70.8					
						Scenario 1	75.7	4.9	74.0	90.5	91	-
I3	4.0	3.0	52.0	1	2	BG	69.6					
						Scenario 1	74.1	4.5	72.2	89.4	89	-
I4	3.0	3.0	45.0	1	2	BG	67.0					
						Scenario 1	74.1	7.1	73.2	89.7	90	-
J3 <sup>(k)</sup>	0.85	1.15	13.98	1	2	BG	58.8					
						Scenario 2	64.5	5.7	63.2	74.6	75	75
J4 <sup>(k)</sup>	0.85	1.15	13.98	1	2	BG	58.7					
						Scenario 2	64.7	6.0	63.4	74.9	75	75

## MTR KTE HOM - FPN SWL Measurement Result

Louvre	Louvre size		Measurement Surface Area <sup>(a)</sup> (m <sup>2</sup> )	D [m] <sup>(b)</sup>	Measurement Method <sup>(c)</sup>	Operation Mode <sup>(d) (e) (f) (g)</sup>	Average measured SPL [dB(A)]		BG corrected SPL <sup>(h)</sup>	Calculated SWL <sup>(i)</sup>	SWL (Daytime and Evening) [dB(A)]	SWL (Night-time) [dB(A)]
	Width (m)	Height (m)					L <sub>Aeq</sub> [dB(A)]	Diff. with BG	L <sub>Aeq</sub> [dB(A)]	L <sub>Aeq</sub> [dB(A)]		
J5 <sup>(k)</sup>	0.85	1.15	13.98	1	2	BG	58.8					
						Scenario 2	64.2	5.3	62.6	74.1	74	74
J6 <sup>(k)</sup>	0.85	1.15	13.98	1	2	BG	58.2					
						Scenario 2	63.7	5.6	62.3	73.8	74	74
K1b <sup>(j)</sup>	0.95	0.95	12.60	1	2	BG	69.0					
						Scenario 2	74.1	5.1	72.5	83.5	84	84
K3	2.1	2.6	36.26	1	2	BG	64.5					
						Scenario 1	65.9	1.5	62.9	78.5	79	-
K4	0.4	1	18.00	1	2	BG	62.7					
						Scenario 1	64.9	2.2	61.9	74.5	75	-
K5	1.8	0.8	23.84	1	2	BG	63.4					
						Scenario 1	63.5	0.1	60.5	74.3	74	-
K6	1.95	1.05	26.05	1	2	BG	60.1					
						Scenario 1	64.0	3.9	61.7	75.9	76	-

### Remarks:

(a) Measurement Surface Area -

For louvre without reflective plane:

$$(W+2D)X(H+2D)+2X(W+2D)+2X(H+2D)$$

For louvre adjacent to one vertical reflective plane:

$$(W+D)X(H+2D)+2X(W+D)+(H+2D)$$

For louvre adjacent to one horizontal reflective plane:

$$(W+2D)X(H+D)+(W+2D)+2X(H+D)$$

For louvre adjacent to one horizontal and one vertical reflective planes:

$$(W+D)X(H+D)+(W+D) + (H+D)$$

For louvre adjacent to three reflective planes:

$$WX(H+D)+DXW$$

(b) D -

Measurement distance between louvre and microphone

(c) Measurement Method 2 -

Near Field Testing Method for Louvre connected to Ventilation Duct(s) or a wall mount fan shown in Annex A2

(d) Scenario 1 -

Full capacity of normal operation mode with emergency mode to check against noise criteria during daytime and evening periods

(e) Scenario 2 -

Full capacity of normal operation mode without emergency mode to check against the noise criteria during night-time period

(f) BG -

Background noise

(g) Emergency mode -

Emergency mode only operates during daytime and evening period for regular maintenance

(h) BG corrected SPL -

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

(i) Calculated SWL -

(refer to Annex A2)  $SWL = \text{Mean } L_{Aeq1min} \text{ over all measurement points} + 10 \log (\text{total surface area over the measurement box}) + K1A + K2A$

K1A refers to background noise correction factor

K2A refers to environmental correction for sound absorption and reflection

(j)

Louvre adjacent to one vertical reflective plane

(k)

Louvre adjacent to one horizontal reflective plane

(l)

Louvre adjacent to one horizontal and one vertical reflective planes

(m)

Louvre adjacent to three reflective planes

## MTR KTE WHA - FPN SWL Measurement Result

Louvre	Louvre size		Measurement Surface Area <sup>(a)</sup> (m <sup>2</sup> )	D [m] <sup>(b)</sup>	Measurement Method <sup>(c)</sup>	Operation Mode <sup>(d) (e) (f) (g)</sup>	Average measured SPL [dB(A)]		BG corrected SPL <sup>(h)</sup>	Calculated SWL <sup>(i)</sup>		SWL (Daytime and Evening) [dB(A)]	SWL (Night-time) [dB(A)]	
	Width (m)	Height (m)					LAeq [dB(A)]	Diff. with BG	LAeq [dB(A)]	LAeq [dB(A)]				
1-1a	4.8	6.0	83.5	1	2	BG	58.5							
				1		Scenario 1	66.8	8.3	66.1	85.3	85	-		
1-2a	1.0	1.6	24.0	1	2	BG	59.2							
				1		Scenario 1	72.0	12.8	72.0	85.8	86	-		
1-2b <sup>(j)</sup>	1.8	5.7	34.9	1	2	BG	57.3							
				1		Scenario 2	63.5	6.2	62.3	77.7	78	78		
1-3a	2.5	1.1	28.9	1	2	BG	55.6							
				1		Scenario 1	62.5	6.9	61.5	76.1	76	-		
1-3b	5.0	1.6	32.4	0.5	2	BG	55.8							
				0.5		Scenario 1	56.0	0.2	53.0	68.1	68	-		
				0.5	2	BG	56.1							
				0.5		Scenario 2	56.3	0.2	53.3	68.4	-	68		
1-3c	0.3	0.2	14.1	1	2	BG	56.6							
				1		Scenario 2	63.6	7.0	62.6	74.1	74	74		
1-3d	3.4	1.6	37.1	1	2	BG	55.9							
				1		Scenario 2	59.0	3.1	56.1	71.8	72	72		
1-4a <sup>(k)</sup>	2.3	1.7	21.3	1	2	BG	54.1							
				1		Scenario 1	69.4	15.3	69.4	82.7	83	-		
1-6a	1.7	5.8	37.1	0.5	2	BG	54.9							
				0.5		Scenario 1	57.2	2.3	54.2	69.9	70	-		
1-6c	5.4	1.3	45.1	1	2	BG	54.4							
				1		Scenario 2	57.9	3.5	55.3	71.9	72	72		
1-7a <sup>(j)</sup>	0.6	0.5	9.7	1	2	BG	56.8							
				1		Scenario 1	58.9	2.1	55.9	65.8	66	-		
1-7b <sup>(j)</sup>	1.0	0.4	6.5	0.5	2	BG	56.8							
				0.5		Scenario 1	64.1	7.3	63.2	71.3	71	-		
2-1a <sup>(l)</sup>	1.4	0.2	6.5	1	2	BG	51.3							
				1		Scenario 1	65.9	14.6	65.9	74.0	74	-		
2-1b	2.4	3.2	42.1	1	2	BG	58.3							
				1		Scenario 2	62.4	4.1	60.3	76.5	77	77		
2-2a	1.2	1.2	23.2	1	2	BG	55.8							
				1		Scenario 1	64.1	8.3	63.4	77.1	77	-		
2-2b	1.2	0.9	21.5	1	2	BG	53.6							
				1		Scenario 1	59.0	5.4	57.5	70.8	71	-		

## MTR KTE WHA - FPN SWL Measurement Result

Louvre	Louvre size		Measurement Surface Area <sup>(a)</sup> (m <sup>2</sup> )	D [m] <sup>(b)</sup>	Measurement Method <sup>(c)</sup>	Operation Mode <sup>(d) (e) (f) (g)</sup>	Average measured SPL [dB(A)]		BG corrected SPL <sup>(h)</sup>	Calculated SWL <sup>(i)</sup>	SWL (Daytime and Evening) [dB(A)]	SWL (Night-time) [dB(A)]
	Width (m)	Height (m)					LAeq [dB(A)]	Diff. with BG	LAeq [dB(A)]	LAeq [dB(A)]		
2-2d	1.1	2.6	29.9	1	2	BG	56.4					
				1		Scenario 2	62.0	5.6	60.6	75.4	75	75
2-3a	1.9	2.6	34.9	1	2	BG	56.7					
				1		Scenario 2	63.1	6.4	62.0	77.4	77	77
2-3b	2.0	1.2	27.2	1	2	BG	54.9					
				1		Scenario 1	67.7	12.8	67.7	82.0	82	-
3-1a	1.8	5.8	52.6	1	2	BG	53.8					
				1		Scenario 1	64.5	10.7	64.5	81.7	82	-
3-1b	3.0	6.1	67.0	1	2	BG	61.7					
				1		Scenario 1	67.8	6.1	66.6	84.8	85	-
3-2a	1.7	5.2	48.4	1	2	BG	53.5					
				1		Scenario 2	67.4	13.9	67.4	84.3	84	84
4-1a	8.9	1.5	66.7	1	2	BG	53.4					
				1		Scenario 2	61.9	8.5	61.2	79.5	80	80
5-1a	2.4	8.5	58.1	0.5	2	BG	55.4					
				0.5		Scenario 1	55.7	0.3	52.7	70.3	70	-

Remarks:

(a) Measurement Surface Area -

For louvre without reflective plane:

$$(W+2D)X(H+2D)+2X(W+2D)+2X(H+2D)$$

For louvre adjacent to one vertical reflective plane:

$$(W+D)X(H+2D)+2X(W+D)+(H+2D)$$

For louvre adjacent to one horizontal reflective plane:

$$(W+2D)X(H+D)+(W+2D)+2X(H+D)$$

For louvre adjacent to one vertical and one horizontal reflective planes:

$$(W+D)X(H+D)+(W+1D)+(H+D)$$

(b) D -

Measurement distance between louvre and microphone

(c) Measurement Method 2 -

Near Field Testing Method for Louvre connected to Ventilation Duct(s) or a wall mount fan shown in Annex A2

(d) Scenario 1 -

Full capacity of normal operation mode with emergency mode to check against noise criteria during daytime and evening periods

(e) Scenario 2 -

Full capacity of normal operation mode without emergency mode to check against the noise criteria during night-time period

(f) BG -

Background noise

(g) Emergency mode -

Emergency mode only operates during daytime and evening period for regular maintenance

(h) BG corrected SPL -

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

(i) Calculated SWL -

(refer to Annex A2)  $SWL = \text{Mean } L_{Aeq1min} \text{ over all measurement points} + 10 \log (\text{total surface area over the measurement box}) + K1A + K2A$

K1A refers to background noise correction factor

K2A refers to environmental correction for sound absorption and reflection

(j) Louvre adjacent to one vertical reflective plane

(k) Louvre adjacent to one horizontal reflective plane

(l) Louvre adjacent to one vertical and one horizontal reflective plane



Annex B

Noise Measurement to  
Confirm any Tonal,  
Impulsive and Intermittent  
Characteristics from the  
Fixed Plant Noise Sources at  
Noise Sensitive Receivers  
(by ERM)

Annex B1

## Calibration Certificates

# Calibration Certificate

Certificate No. **600699**

Page 1 of 4 Pages

**Customer :** Environmental Resources Management

**Address :** 16/F DCH Commercial Centre 25 Westlands Road Quarry Bay Hong Kong

**Order No. :** Q54386

**Date of receipt :** 22-Jan-16

## Item Tested

**Description :** Sound Level Meter

**Manufacturer :** 01dB-Stell

**Model :** Solo

**I.D. :**

**Serial No. :** 65226

## Test Conditions

**Date of Test :** 16-Feb-16

**Supply Voltage :** --

**Ambient Temperature :** (23 ± 3)°C

**Relative Humidity :** (50 ± 25) %

## Test Specifications

Calibration check.

Ref. Document/Procedure: Z01, IEC 651, IEC 804 and IEC 1260.

## Test Results

All results were within the IEC 651 Type1, IEC 804 Type1 and IEC 1260 Class1 specification after adjustment.  
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	C147450	SCL-HKSAR
S240	Sound Level Calibrator	500563	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 :**   
Y. K. 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:** 16-Feb-16

# Calibration Certificate

Certificate No. 600699

Page 2 of 4 Pages

Results :

## 1. Accuracy Check

UUT Setting			Applied Value (dB)	UUT Reading (dB)	
Range (dB)	Response	Weighting		Before adjust	After adjust
20 - 140	Fast	L <sub>A</sub>	94.0	*93.2	93.9
	Slow			--	93.9
	Fast	L <sub>C</sub>		--	93.9
	Slow			--	93.9
	Fast	L <sub>A</sub>	114.0	--	113.9
	Slow			--	113.9
	Fast	L <sub>C</sub>		--	113.9
	Slow			--	113.9

IEC 651 Type 1 Spec. :  $\pm 0.7$  dB

Uncertainty :  $\pm 0.1$  dB

## 2. Level Stability : 0.0 dB

IEC 651 Type 1 Spec. :  $\pm 0.3$  dB

Uncertainty :  $\pm 0.1$  dB

## 3. Linearity

### 3.1 Differential level linearity

UUT Range	Applied Value (dB)	UUT Reading (dB)	Variation (dB)	IEC 651 Type 1 Spec.
140	84.0	83.9	0.0	$\pm 0.4$ dB
	94.0	93.9 (Ref.)	--	
	95.0	94.9	0.0	$\pm 0.2$ dB

Uncertainty :  $\pm 0.1$  dB

# Calibration Certificate

Certificate No. 600699

Page 3 of 4 Pages

## 3. Frequency Weighting

A weighting

Frequency	Attenuation (dB)	IEC 651 Type 1 Spec.
31.5 Hz	- 39.4	- 39.4 dB, $\pm 1.5$ dB
63 Hz	- 26.1	- 26.2 dB, $\pm 1.5$ dB
125 Hz	- 16.1	- 16.1 dB, $\pm 1$ dB
250 Hz	- 8.5	- 8.6 dB, $\pm 1$ dB
500 Hz	- 3.2	- 3.2 dB, $\pm 1$ dB
1 kHz	0.0 (Ref.)	0 dB, $\pm 1$ dB
2 kHz	+ 1.3	+ 1.2 dB, $\pm 1$ dB
4 kHz	+ 1.0	+ 1.0 dB, $\pm 1$ dB
8 kHz	- 1.7	- 1.1 dB, + 1.5 dB ~ - 3 dB
16 kHz	- 12.0	- 6.6 dB, + 3 dB ~ $\infty$

Uncertainty :  $\pm 0.1$  dB

## 4. Time Averaging

Applied Burst duty Factor	Applied Leq Value (dB)	UUT Reading (dB)	IEC 804 Type 1 Spec.
continuous	40.0	40.0	--
1/10	40.0	40.0	$\pm 0.5$ dB
1/10 <sup>2</sup>	40.0	40.0	
1/10 <sup>3</sup>	40.0	40.0	
1/10 <sup>4</sup>	40.0	40.0	

Uncertainty :  $\pm 0.1$  dB

## 6. Filter Characteristics

### 6.1 1/1 – Octave Filter

Frequency	Attenuation (dB)	IEC 1260 Class 1 (dB)
125 Hz	- 75.0	< - 61
250 Hz	- 55.2	< - 42
500 Hz	- 24.4	< - 17.5
707 Hz	- 3.2	- 2 ~ - 5
1 kHz (Ref)	--	--
1.414 kHz	- 2.8	- 2 ~ - 5
2 kHz	- 48.6	< - 17.5
4 kHz	- 88.0	< - 42
8 kHz	- 90.0	< - 61

Uncertainty :  $\pm 0.25$  dB



# Calibration Certificate

Certificate No. **600699**

Page 4 of 4 Pages

## 6.2 1/3 – Octave Filter

Frequency	Attenuation (dB)	IEC 1260 Class 1 (dB)
326 Hz	- 76.0	< - 61
530 Hz	- 60.2	< - 42
772 Hz	- 28.5	< - 17.5
891 Hz	- 3.5	+ 0.3 ~ - 5.0
1 kHz (Ref)	--	--
1.122 kHz	- 3.8	+ 0.3 ~ - 5.0
1.296 kHz	- 31.5	< - 17.5
1.887 kHz	- 65.4	< - 42
3.070 kHz	- 90.3	< - 61

Uncertainty :  $\pm 0.25$  dB

- Remarks :
1. UUT : Unit-Under-Test
  2. The uncertainty claimed is for a confidence probability of not less than 95%.
  3. Atmospheric Pressure : 1 022 hPa.
  4. The UUT was adjusted with the supplied sound calibrator at the reference sound pressure level before the calibration.
  5. \* Out of specification

----- END -----

## Certificate of Calibration

Certificate No. ATS15-100-CC001

**Customer:** **Aeolian View Consultants**  
Room 1907 Tung Che Commercial Centre,  
246 Des Voeux Road West,  
Hong Kong

### Item Tested

<b>Description:</b>	Sound Analyzer	, Microphone
<b>Manufacturer:</b>	Svantek	
<b>Type No.:</b>	Svan-959	, 40AE
<b>Serial No.:</b>	11238	, 520688

### Test Conditions

<b>Temperature:</b>	23°C
<b>Relative Humidity:</b>	65%

**Test Specifications:** Calibration Check

**Date of calibration:** 28 January 2016

**Test Results:** All calibration points are within manufacturer's specification.

The test equipment used for calibration is traceable to National Standards via:  
- South China National Center of Metrology, Guangdong Institute of Metrology

**Certified by:**

  
**X. T. Leung**  
MIOA, MHKIOA



**Issue Date:** 28 January 2016

1. The instrument under test was allowed to stabilize in the laboratory for over 24 hours.
2. Calibration equipment:

Description: Acoustical Calibrator  
 Manufacturer: Brüel & Kjær  
 Type No.: 4231  
 Serial No.: 2478237  
 Last Calibration Date: 17 June 2015  
 Certificate No.: SSD201503359

3. The values given in this certification only related to the values measured at the time of the calibration and any uncertainties quoted will not allow 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 calibration. Acoustic Testing Services Limited shall not be liable for any loss or damage resulting from the use of the equipment.
4. Calibration Results

Setting of unit-under-test (UUT)				Applied value		UUT Reading, dB		
Range, dB	Parameter	Frequency Weighting	Response	Level, dB	Frequency, Hz			
-10-140	SPL	A	F	93.85	1000	93.9		
			S			93.9		
			I			93.9		
		C	F			93.9		
			S			93.9		
			I			93.9		
		L	F			94.0		
			S			93.9		
			I			94.0		
		A	F			113.85	1000	113.9
			S					113.9
			I					113.9

5. The Sound Level Meter has been calibrated in accordance with the requirements as specified in IEC 60651 and IEC 60804 type 1, and vendor specific procedures.



## Certificate of Calibration

Certificate No. ATS15-100-CC003

**Customer:** **Aeolian View Consultants**  
Room 1907 Tung Che Commercial Centre,  
246 Des Voeux Road West,  
Hong Kong

### Item Tested

<b>Description:</b>	Sound Analyzer	, Microphone	, Pre-amplifier
<b>Manufacturer:</b>	NTi Audio		
<b>Type No.:</b>	XL2-TA	, MC230	, MA220
<b>Serial No.:</b>	A2A-08670-E0	, 9422	, 5045

### Test Conditions

<b>Temperature:</b>	25°C
<b>Relative Humidity:</b>	66%

**Test Specifications:** Calibration Check

**Date of calibration:** 04 May 2016

**Test Results:** All calibration points are within manufacturer's specification.

The test equipment used for calibration is traceable to National Standards via:  
- South China National Center of Metrology, Guangdong Institute of Metrology

**Certified by:** 

**Y. T. Leung**  
MIOA, MHKIOA

**Issue Date: 04 May 2016**

1. The instrument under test was allowed to stabilize in the laboratory for over 24 hours.

2. Calibration equipment:

Description: Acoustical Calibrator  
 Manufacturer: Brüel & Kjær  
 Type No.: 4231  
 Serial No.: 2478237  
 Last Calibration Date: 17 June 2015  
 Certificate No.: SSD201503359

3. The values given in this certification only related to the values measured at the time of the calibration and any uncertainties quoted will not allow 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 calibration. Acoustic Testing Services Limited shall not be liable for any loss or damage resulting from the use of the equipment.

4. Calibration Results

Setting of unit-under-test (UUT)				Applied value		UUT Reading, dB		
Range, dB	Parameter	Frequency Weighting	Response	Level, dB	Frequency, Hz			
-10-140	SPL	A	F	93.85	1000	93.9		
			S			93.9		
			I			94.0		
		C	F			94.0		
			S			94.0		
			I			94.1		
		L	F			94.0		
			S			93.9		
			I			94.0		
		A	F			113.85	1000	114.0
			S					114.0
			I					114.0

5. The Sound Level Meter has been calibrated in accordance with the requirements as specified in IEC 60651 and IEC 60804 type 1, and vendor specific procedures.





# Certificate of Calibration 校正證書

Certificate No. : C163994  
證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC16-1623)      Date of Receipt / 收件日期 : 18 July 2016

Description / 儀器名稱 : Sound Level Meter  
Manufacturer / 製造商 : Casella  
Model No. / 型號 : CEL-633C  
Serial No. / 編號 : 0442197  
Supplied By / 委託者 : Envirotech Services Co.  
Room 113, 1/F, My Loft, 9 Hoi Wing Road, Tuen Mun,  
New Territories, Hong Kong

## TEST CONDITIONS / 測試條件

Temperature / 溫度 :  $(23 \pm 2)^{\circ}\text{C}$       Relative Humidity / 相對濕度 :  $(55 \pm 20)\%$   
Line Voltage / 電壓 : ---

## TEST SPECIFICATIONS / 測試規範

Calibration check

DATE OF TEST / 測試日期 : 21 July 2016


## TEST RESULTS / 測試結果

The results apply to the particular unit-under-test only.  
The results do not exceed manufacturer's specification.  
The results are detailed in the subsequent page(s).

The test equipment used for calibration are traceable to National Standards via :

- The Government of The Hong Kong Special Administrative Region Standard & Calibration Laboratory
- Agilent Technologies / Keysight Technologies
- Rohde & Schwarz Laboratory, Germany
- Fluke Everett Service Center, USA

Tested By :   
測試 : H T Wong  
Technical Officer

Certified By :   
核證 : K C Lee  
Project Engineer

Date of Issue : 21 July 2016  
簽發日期

The test equipment used for calibration are traceable to the Nation Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory.

本證書所載校正用之測試器材均可溯源至國際標準。局部複印本證書需先獲本實驗所書面批准。



# Certificate of Calibration

## 校正證書

Certificate No. : C163994  
證書編號

- The unit-under-test (UUT) was allowed to stabilize in the laboratory for over 12 hours, and switched on to warm up for over 10 minutes before the commencement of the test.
- Self-calibration using laboratory acoustic calibrator was performed before test from 6.1.1.2 to 6.3.2.
- The results presented are the mean of 3 measurement at each calibration point.
- Test equipment :

Equipment ID	Description	Certificate No.
CL280	40 MHz Arbitrary Waveform Generator	C160077
CL281	Multifunction Acoustic Calibrator	PA160023

5. Test procedure : MA101N.

6. Results :

6.1 Sound Pressure Level

6.1.1 Reference Sound Pressure Level

6.1.1.1 Before Self-Calibration

UUT Setting		Applied Value		UUT Reading (dB)
Time Weighting	Frequency Weighting	Level (dB)	Freq. (kHz)	
L <sub>F</sub>	A	114.00	1	112.6

6.1.1.2 After Self-Calibration

UUT Setting		Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Time Weighting	Frequency Weighting	Level (dB)	Freq. (kHz)		
L <sub>F</sub>	A	114.00	1	114.0	± 1.1

6.1.2 Linearity

UUT Setting		Applied Value		UUT Reading (dB)
Time Weighting	Frequency Weighting	Level (dB)	Freq. (kHz)	
L <sub>F</sub>	A	114.00	1	114.0 (Ref.)
		104.00		103.9
		94.00		93.6

IEC 61672 Class 1 Spec. : ± 0.6 dB per 10 dB step and ± 1.1 dB for overall different.

6.2 Time Weighting

UUT Setting		Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Time Weighting	Frequency Weighting	Level (dB)	Freq. (kHz)		
L <sub>F</sub>	A	114.00	1	114.0	Ref.
L <sub>S</sub>				114.0	± 0.3

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# Certificate of Calibration

## 校正證書

Certificate No. : C163994

證書編號

### 6.3 Frequency Weighting

#### 6.3.1 A-Weighting

UUT Setting		Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Time Weighting	Frequency Weighting	Level (dB)	Freq.		
L <sub>F</sub>	A	94.00	63 Hz	87.7	-26.2 ± 1.5
			125 Hz	97.8	-16.1 ± 1.5
			250 Hz	105.3	-8.6 ± 1.4
			500 Hz	110.8	-3.2 ± 1.4
			1 kHz	114.0	Ref.
			2 kHz	115.2	+1.2 ± 1.6
			4 kHz	114.9	+1.0 ± 1.6
			8 kHz	112.6	-1.1(+2.1 ; -3.1)
			12.5 kHz	108.4	-4.3(+3.0 ; -6.0)

#### 6.3.2 C-Weighting

UUT Setting		Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Time Weighting	Frequency Weighting	Level (dB)	Freq.		
L <sub>F</sub>	C	94.00	63 Hz	113.2	-0.8 ± 1.5
			125 Hz	113.8	-0.2 ± 1.0
			250 Hz	114.0	0.0 ± 1.0
			500 Hz	114.0	0.0 ± 1.0
			1 kHz	114.0	Ref.
			2 kHz	113.8	-0.2 ± 1.0
			4 kHz	113.1	-0.8 ± 1.0
			8 kHz	110.7	-3.0 (+1.5 ; -3.0)
			12.5 kHz	106.5	-6.2 (+3.0 ; -6.0)

Remarks : - UUT Microphone Model No. : CEL-251 & S/N : 00364

- Mfr's Spec. : IEC 61672 Class 1

- Uncertainties of Applied Value :

114 dB	63 Hz - 125 Hz	: ± 0.45 dB
	250 Hz - 500 Hz	: ± 0.40 dB
	1 kHz	: ± 0.30 dB
	2 kHz - 4 kHz	: ± 0.45 dB
	8 kHz	: ± 0.55 dB
	12.5 kHz	: ± 0.80 dB
104 dB	1 kHz	: ± 0.10 dB (Ref. 114 dB)
94 dB	1 kHz	: ± 0.10 dB (Ref. 114 dB)

- The uncertainties are for a confidence probability of not less than 95 %.

#### Note :

The values given in this 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 environment changes, vibration and shock during transportation, overloading, mis-handling, or the capability of any other laboratory to repeat the measurement. Sun Creation Engineering Limited 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 the Nation Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory.

本證書所載校正用之測試器材均可溯源至國際標準。局部複印本證書需先獲本實驗室書面批准。





輝創工程有限公司

Sun Creation Engineering Limited  
Calibration and Testing Laboratory

# Certificate of Calibration

## 校正證書

Certificate No. : C154709  
證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC15-1720)      Date of Receipt / 收件日期 : 21 August 2015

Description / 儀器名稱 : Precision Sound Level Meter  
Manufacturer / 製造商 : Rion  
Model No. / 型號 : NA-27  
Serial No. / 編號 : 00201194  
Supplied By / 委託者 : Envirotech Services Co.  
Room 113, 1/F, My Loft, 9 Hoi Wing Road, Tuen Mun,  
New Territories, Hong Kong

### TEST CONDITIONS / 測試條件

Temperature / 溫度 :  $(23 \pm 2)^{\circ}\text{C}$       Relative Humidity / 相對濕度 :  $(55 \pm 20)\%$   
Line Voltage / 電壓 : ---

### TEST SPECIFICATIONS / 測試規範

Calibration

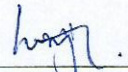
DATE OF TEST / 測試日期 : 26 August 2015

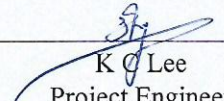
### TEST RESULTS / 測試結果

The results apply to the particular unit-under-test only.  
All results are within manufacturer's specification. (after adjustment)  
The results are detailed in the subsequent page(s).

The test equipment used for calibration are traceable to National Standards via :

- The Government of The Hong Kong Special Administrative Region Standard & Calibration Laboratory
- Agilent Technologies / Keysight Technologies
- Rohde & Schwarz Laboratory, Germany
- Fluke Everett Service Center, USA

Tested By :   
測試 : \_\_\_\_\_  
H T Wong  
Technical Officer

Certified By :   
核證 : \_\_\_\_\_  
K O Lee  
Project Engineer

Date of Issue : 1 September 2015  
簽發日期

The test equipment used for calibration are traceable to the Nation Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory.

本證書所載校正用之測試器材均可溯源至國際標準。局部複印本證書需先獲本實驗室所書面批准。

Sun Creation Engineering Limited - Calibration & Testing Laboratory  
c/o 4/F, Tsing Shan Wan Exchange Building, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong

輝創工程有限公司 - 校正及檢測實驗室  
c/o 香港新界屯門興安里一號青山灣機樓四樓

Tel/電話: 2927 2606 Fax/傳真: 2744 8986 E-mail/電郵: callab@suncreation.com Website/網址: www.suncreation.com



# Certificate of Calibration

## 校正證書

Certificate No. : C154709

證書編號

1. The unit-under-test (UUT) was allowed to stabilize in the laboratory for over 12 hours, and switched on to warm up for over 10 minutes before the commencement of the test.
2. Self-calibration using the internal standard (After Adjustment) was performed before the test 6.1.1.2 to 6.4.
3. The results presented are the mean of 3 measurements at each calibration point.
4. Test equipment :

Equipment ID	Description	Certificate No.
CL280	40 MHz Arbitrary Waveform Generator	C150014
CL281	Multifunction Acoustic Calibrator	DC130171

5. Test procedure : MA101N.

6. Results :

- 6.1 Sound Pressure Level

- 6.1.1 Reference Sound Pressure Level

- 6.1.1.1 Before Adjustment

UUT Setting			Applied Value		UUT Reading (dB)	IEC 60651 Type 1 Spec. (dB)
Range (dB)	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)		
50 - 110	LA	Fast	94.00	1	* 94.8	± 0.7

\* Out of IEC 60651 Type 1 Spec.

- 6.1.1.2 After Adjustment

UUT Setting			Applied Value		UUT Reading (dB)	IEC 60651 Type 1 Spec. (dB)
Range (dB)	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)		
50 - 110	LA	Fast	94.00	1	94.0	± 0.7

- 6.1.2 Linearity

UUT Setting			Applied Value		UUT Reading (dB)
Range (dB)	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)	
60 - 120	LA	Fast	94.00	1	94.0 (Ref.)
			104.00		104.0
			114.00		114.0

IEC 60651 Type 1 Spec. : ± 0.4 dB per 10 dB step and ± 0.7 dB for overall different.

The test equipment used for calibration are traceable to the Nation Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory.

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# Certificate of Calibration

## 校正證書

Certificate No. : C154709

證書編號

### 6.2 Time Weighting

#### 6.2.1 Continuous Signal

UUT Setting			Applied Value		UUT Reading (dB)	IEC 60651 Type 1 Spec. (dB)
Range (dB)	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)		
50 - 110	LA	Fast	94.00	1	94.0	Ref.
		Slow			94.0	

#### 6.2.2 Tone Burst Signal (2 kHz)

UUT Setting			Applied Value		UUT Reading (dB)	IEC 60651 Type 1 Spec. (dB)
Range (dB)	Frequency Weighting	Time Weighting	Level (dB)	Burst Duration		
50 - 110	LA	Fast	106.00	Continuous	106.0	Ref.
	LAmx			200 ms	105.0	-1.0 ± 1.0
	LA	Slow		Continuous	106.0	Ref.
	LAmx			500 ms	102.0	-4.1 ± 1.0

### 6.3 Frequency Weighting

#### 6.3.1 A-Weighting

UUT Setting			Applied Value		UUT Reading (dB)	IEC 60651 Type 1 Spec. (dB)
Range (dB)	Frequency Weighting	Time Weighting	Level (dB)	Freq.		
50 - 110	LA	Fast	94.00	31.5 Hz	54.4	-39.4 ± 1.5
				63 Hz	67.7	-26.2 ± 1.5
				125 Hz	77.7	-16.1 ± 1.0
				250 Hz	85.2	-8.6 ± 1.0
				500 Hz	90.7	-3.2 ± 1.0
				1 kHz	94.0	Ref.
				2 kHz	95.2	+1.2 ± 1.0
				4 kHz	95.0	+1.0 ± 1.0
				8 kHz	92.8	-1.1 (+1.5 ; -3.0)
				12.5 kHz	89.7	-4.3 (+3.0 ; -6.0)

The test equipment used for calibration are traceable to the Nation Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory.

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# Certificate of Calibration

## 校正證書

Certificate No. : C154709

證書編號

### 6.3.2 C-Weighting

UUT Setting			Applied Value		UUT Reading (dB)	IEC 60651 Type 1 Spec. (dB)
Range (dB)	Frequency Weighting	Time Weighting	Level (dB)	Freq.		
50 - 110	LC	Fast	94.00	31.5 Hz	90.8	-3.0 ± 1.5
				63 Hz	93.1	-0.8 ± 1.5
				125 Hz	93.8	-0.2 ± 1.0
				250 Hz	93.9	0.0 ± 1.0
				500 Hz	94.0	0.0 ± 1.0
				1 kHz	93.9	Ref.
				2 kHz	93.8	-0.2 ± 1.0
				4 kHz	93.1	-0.8 ± 1.0
				8 kHz	90.9	-3.0 (+1.5 ; -3.0)
				12.5 kHz	87.7	-6.2 (+3.0 ; -6.0)

### 6.4 Time Averaging

UUT Setting			Applied Value				UUT Reading (dB)	IEC 60804 Type 1 Spec. (dB)	
Range (dB)	Mode	Integrating Time	Freq. (kHz)	Burst Duration (ms)	Burst Duty Factor	Burst Level (dB)			Equivalent Level (dB)
50 - 110	LAeq	10 sec.	4	1	1/10	110.0	100	99.9	± 0.5
							90	90.3	± 0.5
		60 sec.					80	80.1	± 1.0
							70	70.0	± 1.0

Remarks : - UUT Microphone Model No. : UC-53A & S/N : 320128

- Mfr's Spec. : IEC 60651 Type 1 & IEC 60804 Type 1

- Uncertainties of Applied Value : 94 dB : 31.5 Hz - 125 Hz : ± 0.35 dB  
 250 Hz - 500 Hz : ± 0.30 dB  
 1 kHz : ± 0.20 dB  
 2 kHz - 4 kHz : ± 0.35 dB  
 8 kHz : ± 0.45 dB  
 12.5 kHz : ± 0.70 dB  
 104 dB : 1 kHz : ± 0.10 dB (Ref. 94 dB)  
 114 dB : 1 kHz : ± 0.10 dB (Ref. 94 dB)  
 Burst equivalent level : ± 0.2 dB (Ref. 110 dB continuous sound level)

- The uncertainties are for a confidence probability of not less than 95 %.

#### Note :

The values given in this 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 environment changes, vibration and shock during transportation, overloading, mis-handling, or the capability of any other laboratory to repeat the measurement. Sun Creation Engineering Limited shall not be liable for any loss or damage resulting from the use of the equipment.

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Test Data for Sound Level Meter

Page 1 of 5

Sound level meter type: 2250-L  
Microphone type: 4189

Serial No. 2741137  
Serial No. 2550231

Date 17-Oct-2014

Report: 14CA1016 01-02

### SELF GENERATED NOISE TEST

The noise test is performed in the most sensitive range of the SLM with the microphone replaced by an equivalent impedance.

Noise level in A weighting 12.7 dB  
Noise level in C weighting 14.0 dB  
Noise level in Lin 19.8 dB

### LINEARITY TEST

The linearity is tested relative to the reference sound pressure level using a continuous sinusoidal signal of frequency 4 kHz. The measurement is made on the reference range for indications at 5 dB intervals starting from the 94 dB reference sound pressure level. And until within 5 dB of the upper and lower limits of the reference range, the measurements shall be made at 1 dB intervals. (SLM set to LEQ/SPL)

Reference/Expected level	Actual level		Tolerance	Deviation	
	non-integrated	integrated		non-integrated	integrated
dB	dB	dB	+/- dB	dB	dB
94.0	94.0	94.0	0.7	0.0	0.0
99.0	99.0	99.0	0.7	0.0	0.0
104.0	104.0	104.0	0.7	0.0	0.0
109.0	109.0	109.0	0.7	0.0	0.0
114.0	114.0	114.0	0.7	0.0	0.0
119.0	119.0	119.0	0.7	0.0	0.0
124.0	124.0	124.0	0.7	0.0	0.0
129.0	129.0	129.0	0.7	0.0	0.0
134.0	134.0	134.0	0.7	0.0	0.0
135.0	135.0	135.0	0.7	0.0	0.0
136.0	136.0	136.0	0.7	0.0	0.0
137.0	137.0	137.0	0.7	0.0	0.0
138.0	138.0	138.0	0.7	0.0	0.0
139.0	139.0	139.0	0.7	0.0	0.0
140.0	140.0	140.0	0.7	0.0	0.0
89.0	89.0	89.0	0.7	0.0	0.0
84.0	84.0	84.0	0.7	0.0	0.0
79.0	79.0	79.0	0.7	0.0	0.0
74.0	74.0	74.0	0.7	0.0	0.0
69.0	69.0	69.0	0.7	0.0	0.0
64.0	64.0	64.0	0.7	0.0	0.0
59.0	59.0	59.0	0.7	0.0	0.0
54.0	54.0	54.0	0.7	0.0	0.0
49.0	49.0	49.0	0.7	0.0	0.0





Test Data for Sound Level Meter

Page 2 of 5

Sound level meter type: 2250-L Serial No. 2741137 Date 17-Oct-2014  
Microphone type: 4189 Serial No. 2550231

Report: 14CA1016 01-02

44.0	44.0	44.0	0.7	0.0	0.0
39.0	39.0	39.0	0.7	0.0	0.0
34.0	34.0	34.0	0.7	0.0	0.0
33.0	33.0	33.0	0.7	0.0	0.0
32.0	32.0	32.0	0.7	0.0	0.0
31.0	31.0	31.0	0.7	0.0	0.0
30.0	30.0	30.0	0.7	0.0	0.0

Measurements for an indication of the reference SPL on all other ranges which include it

Other ranges	Expected level	Actual level	Tolerance	Deviation
dB	dB	dB	+/- dB	dB
20-140	94.0	94.0	0.7	0.0

Measurements on all level ranges for indications 2 dB below the upper limit and 2 dB above the lower limit

Ranges	Reference/Expected level	Actual level	Tolerance	Deviation
dB	dB	dB	+/- dB	dB
20-140	30.0	30.0	0.7	0.0
	138.0	138.0	0.7	0.0

## FREQUENCY WEIGHTING TEST

The frequency response of the weighting networks are tested at octave intervals over the frequency ranges 31.5 Hz to 12500 Hz. The signal level at 1000 Hz is set to give an indication of the reference SPL.

Frequency weighting A:

Frequency	Ref. level	Expected level	Actual level	Tolerance(dB)		Deviation
				+	-	
Hz	dB	dB	dB			dB
1000.0	94.0	94.0	94.0	0.0	0.0	0.0
31.6	94.0	54.6	54.5	1.5	1.5	-0.1
63.1	94.0	67.8	67.8	1.5	1.5	0.0
125.9	94.0	77.9	77.9	1.0	1.0	0.0
251.2	94.0	85.4	85.4	1.0	1.0	0.0
501.2	94.0	90.8	90.8	1.0	1.0	0.0
1995.0	94.0	95.2	95.2	1.0	1.0	0.0
3981.0	94.0	95.0	94.9	1.0	1.0	-0.1
7943.0	94.0	92.9	92.6	1.5	3.0	-0.3
12590.0	94.0	89.7	89.4	3.0	6.0	-0.3

Frequency weighting C:

Frequency	Ref. level	Expected level	Actual level	Tolerance(dB)		Deviation
				+	-	
Hz	dB	dB	dB			dB
1000.0	94.0	94.0	94.0	0.0	0.0	0.0
31.6	94.0	91.0	91.0	1.5	1.5	0.0



Test Data for Sound Level Meter

Page 3 of 5

Sound level meter type: 2250-L Serial No. 2741137 Date 17-Oct-2014  
Microphone type: 4189 Serial No. 2550231  
Report: 14CA1016 01-02

63.1	94.0	93.2	93.2	1.5	1.5	0.0
125.9	94.0	93.8	93.8	1.0	1.0	0.0
251.2	94.0	94.0	94.0	1.0	1.0	0.0
501.2	94.0	94.0	94.0	1.0	1.0	0.0
1995.0	94.0	93.8	93.8	1.0	1.0	0.0
3981.0	94.0	93.2	93.1	1.0	1.0	-0.1
7943.0	94.0	91.0	90.7	1.5	3.0	-0.3
12590.0	94.0	87.8	87.5	3.0	6.0	-0.3

Frequency weighting Lin:

Frequency Hz	Ref. level dB	Expected level dB	Actual level dB	Tolerance(dB)		Deviation dB
				+	-	
1000.0	94.0	94.0	94.0	0.0	0.0	0.0
31.6	94.0	94.0	94.1	1.5	1.5	0.1
63.1	94.0	94.0	94.0	1.5	1.5	0.0
125.9	94.0	94.0	94.0	1.0	1.0	0.0
251.2	94.0	94.0	94.0	1.0	1.0	0.0
501.2	94.0	94.0	94.0	1.0	1.0	0.0
1995.0	94.0	94.0	94.0	1.0	1.0	0.0
3981.0	94.0	94.0	94.0	1.0	1.0	0.0
7943.0	94.0	94.0	93.7	1.5	3.0	-0.3
12590.0	94.0	94.0	93.7	3.0	6.0	-0.3

TIME WEIGHTING FAST TEST

Time weighting F is tested on the reference range with a single sinusoidal burst of duration 200 ms at a frequency 2000 Hz and an amplitude which produces an indication 4 dB below the upper limit of the primary indicator range when the signal is continuous. (Weight A, Maximum hold)

Ref. level	Expected level	Actual level	Tolerance(dB)		Deviation
dB	dB	dB	+	-	dB
116.0	115.0	115.0	1.0	1.0	0.0

TIME WEIGHTING SLOW TEST

Time weighting S is tested on the reference range with a single sinusoidal burst of duration 500 ms at a frequency 2000 Hz and an amplitude which produces an indication 4 dB below the upper limit of the primary indicator range when the signal is continuous. (Weight A, Maximum hold)

Ref. level	Expected level	Actual level	Tolerance(dB)		Deviation
dB	dB	dB	+	-	dB
116.0	111.9	111.9	1.0	1.0	0.0

RMS ACCURACY TEST

The RMS detector accuracy is tested on the reference range for a crest factor of 3.

Test frequency: 2000 Hz  
Amplitude: 2 dB below the upper limit of the primary indicator range.  
Burst repetition frequency: 40 Hz  
Tone burst signal: 11 cycles of a sine wave of frequency 2000 Hz. (Set to INT)





Test Data for Sound Level Meter

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Sound level meter type: 2250-L Serial No. 2741137 Date 17-Oct-2014  
Microphone type: 4189 Serial No. 2550231  
Report: 14CA1016 01-02

	Ref. Level	Expected level	Tone burst signal	Tolerance	Deviation
Time weighting	dB	dB	indication(dB)	+/- dB	dB
Slow	118.0+6.6	118.0	118.0	0.5	0.0

TIME WEIGHTING IMPULSE TEST

Time weighting I is tested on the reference range (Set the SLM to LAImax)

Test frequency: 2000 Hz

Amplitude: The upper limit of the primary indicator range.

Single sinusoidal burst of duration 5 ms:

Ref. Level	Single burst indication		Tolerance	Deviation
dB	Expected (dB)	Actual (dB)	+/- dB	dB
120.0	111.2	111.1	2.0	-0.1

Repeated at 100 Hz

Ref. Level	Repeated burst indication		Tolerance	Deviation
dB	Expected (dB)	Actual (dB)	+/- dB	dB
120.0	117.3	117.2	1.0	-0.1

TIME AVERAGING TEST

This test compares the SLM reading for continuous sine signals with readings obtained from a sine tone burst sequence having the same RMS level. The test level is 30 dB below the upper limit of the linearity range and repeated for Type 1 SLM with 40 dB below the upper limit of the linearity.

Frequency of tone burst: 4000 Hz

Duration of tone burst: 1 ms

Repetition Time	Level of tone burst	Expected Leq	Actual Leq	Tolerance	Deviation	Remarks
msec	dB	dB	dB	+/- dB	dB	
1000	110.0	110.0	109.9	1.0	-0.1	60s integ.
10000	100.0	100.0	99.9	1.0	-0.1	6min. integ.

PULSE RANGE AND SOUND EXPOSURE LEVEL TEST

The test tone burst signal is superimposed on a baseline signal corresponding to the lower limit of reference rar

Test frequency: 4000 Hz

Integration time: 10 sec

The integrating sound level meter set to Leq:

Duration	Rms level of tone burst (dB)	Expected	Actual	Tolerance	Deviation
msec	tone burst (dB)	dB	dB	+/- dB	dB
10	120.0	90.0	89.9	1.7	-0.1

The integrating sound level meter set to SEL:

Duration	Rms level of tone burst (dB)	Expected	Actual	Tolerance	Deviation
msec	tone burst (dB)	dB	dB	+/- dB	dB
10.0	120.0	100.0	99.9	1.7	-0.1



Test Data for Sound Level Meter

Page 5 of 5

Sound level meter type: 2250-L Serial No. 2741137 Date 17-Oct-2014  
Microphone type: 4189 Serial No. 2550231  
Report: 14CA1016 01-02

OVERLOAD INDICATION TEST

For SLM capable of operating in a non-integrating mode.

Test frequency: 2000 Hz  
Amplitude: 2 dB below the upper limit of the primary indicator range.  
Burst repetition frequency: 40 Hz  
Tone burst signal: 11 cycles of a sine wave of frequency 2000 Hz.

Level	Level reduced by	Further reduced	Difference	Tolerance	Deviation
at overload (dB)	1 dB	3 dB	dB	dB	dB
135.0	134.0	131.0	3.0	1.0	0.0

For integrating SLM, with the instrument indicating Leq.

For integrating SLM, with the instrument indicating Leq and set to the reference range. The test signal as follow  
The test tone burst signal is superimposed on a baseline signal corresponding to the lower limit of reference range  
Test frequency: 4000 Hz  
Integration time: 10 sec  
Single burst duration: 1 msec

Rms level	Level reduced by	Expected level	Actual level	Tolerance	Deviation
at overload (dB)	1 dB	dB	dB	dB	dB
141.9	140.9	100.9	100.8	2.2	-0.1

ACOUSTIC TEST

The acoustic test of the complete SLM is tested at the frequency 125 Hz and 8000 Hz using a B&K type 4226 Multifunction Acoustic Calibrator. The test is performed in A weighting.

Frequency Hz	Expected level dB	Actual level Measured (dB)	Tolerance (dB)		Deviation dB
			+	-	
1000	94.0	94.0	0.0	0.0	0.0
125	77.9	77.8	1.0	1.0	-0.1
8000	92.9	93.7	1.5	3.0	0.8

-----END-----





# MAXLAB

## CALIBRATION CERTIFICATE

### Certificate Information

Date of Issue

7-Mar-2015

Certificate Number

MLCN150354S

### Customer Information

Company Name

Wilson Accoustics Limited

Address

Unit 601, Block A, Shatin Industrial Centre,  
Yuen Shun Circuit,  
Shatin, N. T.,  
Hong Kong

### Equipment-under-Test (EUT)

Description

Hand-held Analyzer

Manufacturer

Brüel & Kjær

Model Number

Type 2250-L

Serial Number

2675655

Equipment Number

--

### Calibration Particular

Date of Calibration

7-Mar-2015

Calibration Equipment

4231(MLTE008) / PA140064 / 29-Apr-2016

Calibration Procedure

MLCG00, MLCG15

Calibration Conditions

Laboratory	Temperature	23 °C ± 5 °C
	Relative Humidity	55% ± 25%
EUT	Stabilizing Time	Over 3 hours
	Warm-up Time	10 minutes
	Power Supply	Internal battery

Calibration Results

Calibration data were detailed in the continuation pages.

### Approved By & Date

K.O. Lo

7-Mar-2015

### Statements

- \* Calibration equipment used for this calibration are traceable to national / international standards.
- \* The results on this Calibration Certificate only relate to the values measured at the time of the calibration and the uncertainties quoted will not include allowance for the EUT long term drift, variation with environmental changes, vibration and shock during transportation, overloading, mishandling, misuse, and the capacity of any other laboratory to repeat the measurement.
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# MAXLAB

Certificate No. MLCN150354S

<b>Calibration Data</b>							
Parameter	Range (dB)	Frequency Weighting	Response	EUT Reading	Standard Reading	EUT Error	Calibration Uncertainty
SPL	Auto 20 - 140	A (1 kHz Input)	F	93.9 dB	94.0 dB	-0.1 dB	0.2 dB
			S	93.9 dB	94.0 dB	-0.1 dB	0.2 dB
			I	93.9 dB	94.0 dB	-0.1 dB	0.2 dB
		Z (1 kHz Input)	F	93.9 dB	94.0 dB	-0.1 dB	0.2 dB
			S	93.9 dB	94.0 dB	-0.1 dB	0.2 dB
			I	93.9 dB	94.0 dB	-0.1 dB	0.2 dB
		A (1 kHz Input)	F	113.9 dB	114.0 dB	-0.1 dB	0.2 dB
			S	113.9 dB	114.0 dB	-0.1 dB	0.2 dB
			I	113.9 dB	114.0 dB	-0.1 dB	0.2 dB
		Z (1 kHz Input)	F	113.9 dB	114.0 dB	-0.1 dB	0.2 dB
			S	113.9 dB	114.0 dB	-0.1 dB	0.2 dB
			I	113.9 dB	114.0 dB	-0.1 dB	0.2 dB

- END -

Calibrated By :  
Date :

Dan  
7-Mar-2015

Checked By :  
Date :

K.O. Lo  
7-Mar-2015

Page 2 of 2

萬儀校正中心有限公司  
MaxLab Calibration Centre Limited

香港新界葵涌華星街 16-18 號保盈工業大廈 9 樓 B2 室





# MAXLAB

## CALIBRATION CERTIFICATE

### Certificate Information

Date of Issue	1-Feb-2016	Certificate Number	MLCN160237S
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### Customer Information

Company Name	Acoustics Innovation Limited
Address	Unit 601, Block A, Shatin Industrial Centre, Yuen Shun Circuit, Shatin, N. T.

### Equipment-under-Test (EUT)

Description	Sound Level Meter
Manufacturer	Svantek
Model Number	SVAN 955
Serial Number	15234
Equipment Number	--

### Calibration Particular

Date of Calibration	1-Feb-2016		
Calibration Equipment	4231(MLTE008) / PA140064 / 29-Apr-2016		
Calibration Procedure	MLCG00, MLCG15		
Calibration Conditions	Laboratory	Temperature	23 °C ± 5 °C
		Relative Humidity	55% ± 25%
	EUT	Stabilizing Time	Over 3 hours
		Warm-up Time	10 minutes
		Power Supply	Internal battery
Calibration Results	Calibration data were detailed in the continuation pages.		

### Approved By & Date

K.O. Lo

1-Feb-2016

### Statements

- \* Calibration equipment used for this calibration are traceable to national / international standards.
- \* The results on this Calibration Certificate only relate to the values measured at the time of the calibration and the uncertainties quoted will not include allowance for the EUT long term drift, variation with environmental changes, vibration and shock during transportation, overloading, mishandling, misuse, and the capacity of any other laboratory to repeat the measurement.
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# MAXLAB

Certificate No.MLCN160237S

<b>Calibration Data</b>							
<b>Parameter</b>	<b>Frequency Weighting</b>	<b>Range (dB)</b>	<b>Time Weighting</b>	<b>EUT Reading</b>	<b>Standard Reading</b>	<b>EUT Error</b>	<b>Calibration Uncertainty</b>
SPL	A (1 kHz Input)	25 - 130	F	94 dB	94.0 dB	0.0 dB	0.2 dB
			S	94 dB	94.0 dB	0.0 dB	0.2 dB
			I	94 dB	94.0 dB	0.0 dB	0.2 dB
	C (1 kHz Input)	25 - 130	F	94 dB	94.0 dB	0.0 dB	0.2 dB
			S	94 dB	94.0 dB	0.0 dB	0.2 dB
			I	94 dB	94.0 dB	0.0 dB	0.2 dB
	Z (1 kHz Input)	25 - 130	F	94 dB	94.0 dB	0.0 dB	0.2 dB
			S	94 dB	94.0 dB	0.0 dB	0.2 dB
			I	94 dB	94.0 dB	0.0 dB	0.2 dB
	A (1 kHz Input)	25 - 130	F	114 dB	114.0 dB	0.0 dB	0.2 dB
			S	114 dB	114.0 dB	0.0 dB	0.2 dB
			I	114 dB	114.0 dB	0.0 dB	0.2 dB
C (1 kHz Input)	25 - 130	F	114 dB	114.0 dB	0.0 dB	0.2 dB	
		S	114 dB	114.0 dB	0.0 dB	0.2 dB	
		I	114 dB	114.0 dB	0.0 dB	0.2 dB	
Z (1 kHz Input)	25 - 130	F	114 dB	114.0 dB	0.0 dB	0.2 dB	
		S	114 dB	114.0 dB	0.0 dB	0.2 dB	
		I	114 dB	114.0 dB	0.0 dB	0.2 dB	

- END -

Calibrated By :  
Date :

Dan  
1-Feb-2016

Checked By :  
Date :


K.O. Lo  
1-Feb-2016  
Page 2 of 2





# MAXLAB

## CALIBRATION CERTIFICATE

<i>Certificate Information</i>			
Date of Issue	4-May-2015	Certificate Number MLCN150723S	
<i>Customer Information</i>			
Company Name	Wilson Accoustics Limited		
Address	Unit 601, Block A, Shatin Industrial Centre, Yuen Shun Circuit, Shatin, N. T., Hong Kong		
<i>Equipment-under-Test (EUT)</i>			
Description	Sound & Vibration Analyser		
Manufacturer	Svantek		
Model Number	SVAN 958		
Serial Number	20890		
Equipment Number	--		
<i>Calibration Particular</i>			
Date of Calibration	2-May-2015		
Calibration Equipment	4231(MLTE008) / PA140064 / 29-Apr-2016		
Calibration Procedure	MLCG00, MLCG15		
Calibration Conditions	Laboratory	Temperature	23 °C ± 5 °C
		Relative Humidity	55% ± 25%
	EUT	Stabilizing Time	Over 3 hours
		Warm-up Time	10 minutes
		Power Supply	Internal battery
Calibration Results	Calibration data were detailed in the continuation pages.		
<i>Approved By &amp; Date</i>			
		K.O. Lo 4-May-2015	
<i>Statements</i>			
<ul style="list-style-type: none"> <li>* Calibration equipment used for this calibration are traceable to national / international standards.</li> <li>* The results on this Calibration Certificate only relate to the values measured at the time of the calibration and the uncertainties quoted will not include allowance for the EUT long term drift, variation with environmental changes, vibration and shock during transportation, overloading, mishandling, misuse, and the capacity of any other laboratory to repeat the measurement.</li> <li>* MaxLab Calibration Centre Limited shall not be liable for any loss or damage resulting from the use of the EUT.</li> <li>* The copy of this Certificate is owned by MaxLab Calibration Centre Limited. No part of this Certificate may be reproduced without the prior written approval of MaxLab Calibration Centre Limited.</li> </ul>			





# MAXLAB

Certificate No MLCN150723S

<b>Calibration Data</b>						
<b>Channel / Mode</b>	<b>Filter / Detector</b>	<b>Range</b>	<b>EUT Reading</b>	<b>Standard Reading</b>	<b>EUT Error</b>	<b>Calibration Uncertainty</b>
CH4 / Sound	A / FAST (1 kHz Input)	105 dB	94.0 dB	94.0 dB	0.0 dB	0.2 dB
		130 dB	94.1 dB	94.0 dB	0.1 dB	0.2 dB
			114.1 dB	114.0 dB	0.1 dB	0.2 dB
	C / FAST (1 kHz Input)	105 dB	94.0 dB	94.0 dB	0.0 dB	0.2 dB
		130 dB	94.1 dB	94.0 dB	0.1 dB	0.2 dB
			114.1 dB	114.0 dB	0.1 dB	0.2 dB
	LIN / FAST (1 kHz Input)	105 dB	94.0 dB	94.0 dB	0.0 dB	0.2 dB
		130 dB	94.1 dB	94.0 dB	0.1 dB	0.2 dB
			114.1 dB	114.0 dB	0.1 dB	0.2 dB
	A / SLOW (1 kHz Input)	105 dB	94.0 dB	94.0 dB	0.0 dB	0.2 dB
		130 dB	114.1 dB	114.0 dB	0.1 dB	0.2 dB
	C / SLOW (1 kHz Input)	105 dB	94.0 dB	94.0 dB	0.0 dB	0.2 dB
		130 dB	114.1 dB	114.0 dB	0.1 dB	0.2 dB
	LIN / SLOW (1 kHz Input)	105 dB	94.0 dB	94.0 dB	0.0 dB	0.2 dB
		130 dB	114.1 dB	114.0 dB	0.1 dB	0.2 dB
	A / IMPULSE (1 kHz Input)	105 dB	94.0 dB	94.0 dB	0.0 dB	0.2 dB
		130 dB	114.1 dB	114.0 dB	0.1 dB	0.2 dB
	C / IMPULSE (1 kHz Input)	105 dB	94.0 dB	94.0 dB	0.0 dB	0.2 dB
		130 dB	114.1 dB	114.0 dB	0.1 dB	0.2 dB
	LIN / IMPULSE (1 kHz Input)	105 dB	94.0 dB	94.0 dB	0.0 dB	0.2 dB
130 dB		114.1 dB	114.0 dB	0.1 dB	0.2 dB	

- END -

Calibrated By :  
Date :

Dan  
2-May-2015

Checked By :  
Date :

K.O. Lo  
4-May-2015

Page 2 of 2





# MAXLAB

## CALIBRATION CERTIFICATE

<i>Certificate Information</i>			
Date of Issue	20-Oct-2014		
Certificate Number	MLCN141705S		
<i>Customer Information</i>			
Company Name	Wilson Accoustics Limited		
Address	Unit 601, Block A, Shatin Industrial Centre, Yuen Shun Circuit, Shatin, N. T., Hong Kong		
<i>Equipment-under-Test (EUT)</i>			
Description	Sound & Vibration Analyser		
Manufacturer	Svantek		
Model Number	SVAN 958		
Serial Number	28422		
Equipment Number	--		
<i>Calibration Particular</i>			
Date of Calibration	20-Oct-2014		
Calibration Equipment	4231(MLTE008) / PA140064 / 29-Apr-2016		
Calibration Procedure	MLCG00, MLCG15		
Calibration Conditions	Laboratory	Temperature	23 °C ± 5 °C
		Relative Humidity	55% ± 25%
	EUT	Stabilizing Time	Over 3 hours
		Warm-up Time	10 minutes
		Power Supply	Internal battery
Calibration Results	Calibration data were detailed in the continuation pages.		
<i>Approved By &amp; Date</i>			
		K.O. Lo	20-Oct-2014
<i>Statements</i>			
<ul style="list-style-type: none"> <li>* Calibration equipment used for this calibration are traceable to national / international standards.</li> <li>* The results on this Calibration Certificate only relate to the values measured at the time of the calibration and the uncertainties quoted will not include allowance for the EUT long term drift, variation with environmental changes, vibration and shock during transportation, overloading, mishandling, misuse, and the capacity of any other laboratory to repeat the measurement.</li> <li>* MaxLab Calibration Centre Limited shall not be liable for any loss or damage resulting from the use of the EUT.</li> <li>* The copy of this Certificate is owned by MaxLab Calibration Centre Limited. No part of this Certificate may be reproduced without the prior written approval of MaxLab Calibration Centre Limited.</li> </ul>			



# MAXLAB

Certificate NoMLCN141705S

<b>Calibration Data</b>						
<b>Channel / Mode</b>	<b>Filter / Detector</b>	<b>Range</b>	<b>EUT Reading</b>	<b>Standard Reading</b>	<b>EUT Error</b>	<b>Calibration Uncertainty</b>
CH4 / Sound	A / FAST (1 kHz Input)	105 dB	94.0 dB	94.0 dB	0.0 dB	0.2 dB
		130 dB	94.0 dB	94.0 dB	0.0 dB	0.2 dB
			114.2 dB	114.0 dB	0.2 dB	0.2 dB
	C / FAST (1 kHz Input)	105 dB	94.0 dB	94.0 dB	0.0 dB	0.2 dB
		130 dB	94.0 dB	94.0 dB	0.0 dB	0.2 dB
			114.2 dB	114.0 dB	0.2 dB	0.2 dB
	LIN / FAST (1 kHz Input)	105 dB	94.0 dB	94.0 dB	0.0 dB	0.2 dB
		130 dB	94.0 dB	94.0 dB	0.0 dB	0.2 dB
			114.2 dB	114.0 dB	0.2 dB	0.2 dB
	A / SLOW (1 kHz Input)	105 dB	94.0 dB	94.0 dB	0.0 dB	0.2 dB
		130 dB	114.2 dB	114.0 dB	0.2 dB	0.2 dB
	C / SLOW (1 kHz Input)	105 dB	94.0 dB	94.0 dB	0.0 dB	0.2 dB
		130 dB	114.2 dB	114.0 dB	0.2 dB	0.2 dB
	LIN / SLOW (1 kHz Input)	105 dB	94.0 dB	94.0 dB	0.0 dB	0.2 dB
		130 dB	114.2 dB	114.0 dB	0.2 dB	0.2 dB
	A / IMPULSE (1 kHz Input)	105 dB	94.0 dB	94.0 dB	0.0 dB	0.2 dB
		130 dB	114.2 dB	114.0 dB	0.2 dB	0.2 dB
	C / IMPULSE (1 kHz Input)	105 dB	94.0 dB	94.0 dB	0.0 dB	0.2 dB
130 dB		114.2 dB	114.0 dB	0.2 dB	0.2 dB	
LIN / IMPULSE (1 kHz Input)	105 dB	94.0 dB	94.0 dB	0.0 dB	0.2 dB	
	130 dB	114.2 dB	114.0 dB	0.2 dB	0.2 dB	

- END -

Calibrated By :  
Date :

Dan  
20-Oct-2014

Checked By :  
Date :

K.O. Lo  
20-Oct-2014

Page 2 of 2

萬儀校正中心有限公司  
MaxLab Calibration Centre Limited

香港新界葵涌華星街 16-18 號保盈工業大廈 9 樓 B2 室





# Calibration Certificate

Certificate No. **600700**

Page 1 of 2 Pages

**Customer :** Environmental Resources Management

**Address :** 16/F DCH Commercial Centre 25 Westlands Road Quarry Bay Hong Kong

**Order No. :** Q54386

**Date of receipt :** 22-Jan-16

## Item Tested

**Description :** Sound Level Calibrator

**Manufacturer :** 01dB-Stell

**I.D. :** --

**Model :** CAL21

**Serial No. :** 34113607(2011)

## Test Conditions

**Date of Test :** 27-Jan-16

**Supply Voltage :** --

**Ambient Temperature :** (23 ± 3)°C

**Relative Humidity :** (50 ± 25) %

## Test Specifications

Calibration check.

Calibration procedure : Z02, IEC942.

## Test Results

All results were within the IEC 942 Class 2 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>
S240	Sound Level Calibrator	500563	NIM-PRC & SCL-HKSAR
S041	Universal Counter	506951	SCL-HKSAR
S014	Spectrum Analyzer	505317	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 :**   
Alan Chu

**Approved by :**   
Steve Kwan

**Date:** 27-Jan-16



# Calibration Certificate

Certificate No. 600700

Page 2 of 2 Pages

Results :

## 1. Level Accuracy (at 1 kHz)

UUT Nominal Value (dB)	Measured Value (dB)	IEC 942 Class 2 Spec.
94	94.0	$\pm 0.5$ dB

Uncertainty :  $\pm 0.1$  dB

## 2. Frequency Accuracy

UUT Nominal Value	Measured Value	IEC 942 Class 2 Spec.
1 kHz	1.003 kHz	$\pm 4$ %

Uncertainty :  $\pm 0.1$  %

## 3. Level Stability : 0.0 dB

IEC 942 Class 2 Spec. :  $\pm 0.2$  dB

Uncertainty :  $\pm 0.01$  dB

## 4. Total Harmonic Distortion : $< 1.5$ %

IEC 942 Class 2 Spec. :  $< 3$  %

Uncertainty :  $\pm 2.3$  % of rdg.

Remark : 1. UUT : Unit-Under-Test

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

3. Atmospheric Pressure : 1 010 hPa.

----- END -----



## Certificate of Calibration

Certificate No. ATS15-100-CC002

**Customer:** **Aeolian View Consultants**  
Room 1907 Tung Che Commercial Centre,  
246 Des Voeux Road West,  
Hong Kong

### Item Tested

**Description:** Sound Level Calibrator  
**Manufacturer:** Svantek  
**Type No.:** SV-30A  
**Serial No.:** 7441

### Test Conditions

**Temperature:** 23°C  
**Relative Humidity:** 65%

**Test Specifications:** Calibration Check

**Date of calibration:** 28 January 2016

**Test Results:** All calibration points are within manufacturer's specification.

The test equipment used for calibration is traceable to National Standards via:  
- Standards and Calibration Laboratory, the Government of the HKSAR,

Certified by:

Y. T. LEUNG  
MIOA, MHKIOA

Issue Date: 28 January 2016

1. The instrument under test was allowed to stabilize in the laboratory for over 24 hours.
2. Calibration equipment:

	Type	Serial No.	Last Calibration Date	Calibration Report Number	Traceable to
<b>PULSE Frequency Analyzer</b>	3560-B	2454296	13-Feb-2015	LF150064	SCL, HKSAR
<b>Reference Microphone*</b>	B&K 4942	2497997	11-Feb-2015	PA150018	SCL, HKSAR

3. Calibration Results

Nominal value dB	Measured value dB	Expanded Measurement Uncertainty of Reference Microphone B&K 4942 at 1000 Hz	
		dB	mV/Pa
94.00	93.84	0.07	0.36





# Certificate of Calibration

## 校正證書

Certificate No. : C163756  
證書編號

ITEM TESTED / 送檢項目 ( Job No. / 序引編號 : IC16-1465 )      Date of Receipt / 收件日期 : 29 June 2016  
Description / 儀器名稱 : Sound Level Calibrator  
Manufacturer / 製造商 : Rion  
Model No. / 型號 : NC-73  
Serial No. / 編號 : 10786708  
Supplied By / 委託者 : Envirotech Services Co.  
Room 113, 1/F, My Loft, 9 Hoi Wing Road, Tuen Mun,  
New Territories, Hong Kong

### TEST CONDITIONS / 測試條件

Temperature / 溫度 : (23 ± 2)°C      Relative Humidity / 相對濕度 : (55 ± 20)%  
Line Voltage / 電壓 : ---

### TEST SPECIFICATIONS / 測試規範

Calibration

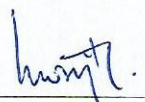
DATE OF TEST / 測試日期 : 11 July 2016

### TEST RESULTS / 測試結果

The results apply to the particular unit-under-test only.  
The results do not exceed manufacturer's specification.  
The results are detailed in the subsequent page(s).

The test equipment used for calibration are traceable to National Standards via :

- The Government of The Hong Kong Special Administrative Region Standard & Calibration Laboratory
- Agilent Technologies / Keysight Technologies
- Rohde & Schwarz Laboratory, Germany
- Fluke Everett Service Center, USA

Tested By :   
測試 : \_\_\_\_\_  
H T Wong  
Technical Officer

Certified By :   
核證 : \_\_\_\_\_  
K C Lee  
Project Engineer

Date of Issue : 12 July 2016  
簽發日期

The test equipment used for calibration are traceable to the Nation Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory.

本證書所載校正用之測試器材均可溯源至國際標準。局部複印本證書需先獲本實驗室書面批准。



# Certificate of Calibration

## 校正證書

Certificate No. : C163756  
證書編號

1. The unit-under-test (UUT) was allowed to stabilize in the laboratory for over 12 hours before the commencement of the test.
2. The results presented are the mean of 3 measurements at each calibration point.
3. Test equipment :

Equipment ID	Description	Certificate No.
CL130	Universal Counter	C163709
CL281	Multifunction Acoustic Calibrator	PA160023
TST150A	Measuring Amplifier	C161175

4. Test procedure : MA100N.

5. Results :

### 5.1 Sound Level Accuracy

#### 5.1.1 Before Adjustment

UUT Nominal Value	Measured Value (dB)	Mfr's Spec. (dB)	Uncertainty of Measured Value (dB)
94 dB, 1 kHz	93.7	± 0.5	± 0.2

#### 5.1.2 After Adjustment

UUT Nominal Value	Measured Value (dB)	Mfr's Spec. (dB)	Uncertainty of Measured Value (dB)
94 dB, 1 kHz	94.0	± 0.5	± 0.2

### 5.2 Frequency Accuracy

#### 5.2.1 Before Adjustment

UUT Nominal Value (kHz)	Measured Value (kHz)	Mfr's Spec.	Uncertainty of Measured Value (Hz)
1	0.987	1 kHz ± 2 %	± 1

#### 5.2.2 After Adjustment

UUT Nominal Value (kHz)	Measured Value (kHz)	Mfr's Spec.	Uncertainty of Measured Value (Hz)
1	0.987	1 kHz ± 2 %	± 1

The test equipment used for calibration are traceable to the Nation Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory.

本證書所載校正用之測試器材均可溯源至國際標準。局部複印本證書需先獲本實驗室所書面批准。





輝創工程有限公司  
Sun Creation Engineering Limited  
Calibration and Testing Laboratory

# Certificate of Calibration

## 校正證書

Certificate No. : C163756  
證書編號

Remark : The uncertainties are for a confidence probability of not less than 95 %.

Note :

The values given in this 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 environment changes, vibration and shock during transportation, overloading, mis-handling, or the capability of any other laboratory to repeat the measurement. Sun Creation Engineering Limited 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 the Nation Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory.

本證書所載校正用之測試器材均可溯源至國際標準。局部複印本證書需先獲本實驗所書面批准。



## CERTIFICATE OF CALIBRATION

Certificate No.: 15CA1110 01 Page: 1 of 2

### Item tested

Description: Acoustical Calibrator (Class 1)  
Manufacturer: B & K  
Type/Model No.: 4231  
Serial/Equipment No.: 2309393  
Adaptors used: -

### Item submitted by

Customer: MTR Corporation Limited  
Address of Customer: -  
Request No.: -  
Date of receipt: 10-Nov-2015

Date of test: 11-Nov-2015

### Reference equipment used in the calibration

Description:	Model:	Serial No.	Expiry Date:	Traceable to:
Lab standard microphone	B&K 4180	2341427	15-Apr-2016	SCL
Preamplifier	B&K 2673	2743150	22-Apr-2016	CEPREI
Measuring amplifier	B&K 2610	2346941	22-Apr-2016	CEPREI
Signal generator	DS 360	61227	16-Apr-2016	CEPREI
Digital multi-meter	34401A	US36087050	17-Apr-2016	CEPREI
Audio analyzer	8903B	GB41300350	17-Apr-2016	CEPREI
Universal counter	53132A	MY40003662	16-Apr-2016	CEPREI

### Ambient conditions

Temperature:  $22 \pm 1$  °C  
Relative humidity:  $50 \pm 10$  %  
Air pressure:  $1010 \pm 5$  hPa

### Test specifications

- The Sound Calibrator has been calibrated in accordance with the requirements as specified in IEC 60942 1997 Annex B and the lab calibration procedure SMTP004-CA-156.
- The calibrator was tested with its axis vertical facing downwards at the specific frequency using insert voltage technique.
- The results are rounded to the nearest 0.01 dB and 0.1 Hz and have not been corrected for variations from a reference pressure of 1013.25 hectoPascals as the maker's information indicates that the instrument is insensitive to pressure changes.

### Test results

This is to certify that the sound calibrator conforms to the requirements of annex B of IEC 60942: 1997 for the conditions under which the test was performed. This does not imply that the sound calibrator meets IEC 60942 under any other conditions.

Details of the performed measurements are presented on page 2 of this certificate.

Approved Signatory:

Huang Jian Min/Feng Jun Qi

Date: 12-Nov-2015

Company Chop:



Comments: The results reported in this certificate refer to the condition of the instrument on the date of calibration and carry no implication regarding the long-term stability of the instrument.





## CERTIFICATE OF CALIBRATION

(Continuation Page)

Certificate No.: 15CA1110 01 Page: 2 of 2

### 1, Measured Sound Pressure Level

The output Sound Pressure Level in the calibrator head was measured at the setting and frequency shown using a calibrated laboratory standard microphone and insert voltage technique. The results are given in below with the estimated uncertainties.

Frequency Shown Hz	Output Sound Pressure Level Setting dB	Measured Output Sound Pressure Level dB	(Output level in dB re 20 $\mu$ Pa)
			Estimated Expanded Uncertainty dB
1000	94.00	94.06	0.10

### 2, Sound Pressure Level Stability - Short Term Fluctuations

The Short Term Fluctuations was determined by measuring the maximum and minimum of the fast weighted DC output of the B&K 2610 measuring amplifier over a 20 second time interval as required in the standard. The Short Term Fluctuation was found to be:

At 1000 Hz STF = 0.002 dB  
Estimated expanded uncertainty 0.005 dB

### 3, Actual Output Frequency

The determination of actual output frequency was made using a B&K 4180 microphone together with a B&K 2673 preamplifier connected to a B&K 2610 measuring amplifier. The AC output of the B&K 2610 was taken to an universal counter which was used to determine the frequency averaged over 20 second of operation as required by the standard. The actual output frequency at 1 KHz was:

At 1000 Hz Actual Frequency = 1000.0 Hz  
Estimated expanded uncertainty 0.1 Hz Coverage factor k = 2.2

### 4, Total Noise and Distortion

For the Total Noise and Distortion measurement, the unfiltered AC output of the B&K 2610 measuring amplifier was connected to an Agilent Type 8903 B distortion analyser. The TND result at 1 KHz was:

At 1000 Hz TND = 0.5 %  
Estimated expanded uncertainty 0.7 %

The expanded uncertainties have been calculated in accordance with the ISO Publication "Guide to the expression of uncertainty in measurement", and gives an interval estimated to have a level of confidence of 95%. A coverage factor of 2 is assumed unless explicitly stated.

Calibrated by:

Date: 11-Nov-2015

Fung Chi Yip

- End -

Checked by:

Date: 12-Nov-2015

Lam Tze Wai

The standard(s) and equipment used in the calibration are traceable to national or international recognised standards and are calibrated on a schedule to maintain the required accuracy level.



# MAXLAB

## CALIBRATION CERTIFICATE

### Certificate Information

Date of Issue

1-Feb-2016

Certificate Number

MLCN160236S

### Customer Information

Company Name

Acoustics Innovation Limited

Address

Unit 601, Block A, Shatin Industrial Centre,  
Yuen Shun Circuit,  
Shatin, N. T.

### Equipment-under-Test (EUT)

Description

Acoustic Calibrator

Manufacturer

Svantek

Model Number

SV 30A

Serial Number

29088

Equipment Number

--

### Calibration Particular

Date of Calibration

1-Feb-2016

Calibration Equipment

4231(MLTE008) / PA140064 / 29-Apr-16  
1351(MLTE049) / MLEC15/06/02 / 3-Jun-16

Calibration Procedure

MLCG00, MLCG15

Calibration Conditions

Laboratory	Temperature	23 °C ± 5 °C
	Relative Humidity	55% ± 25%
EUT	Stabilizing Time	Over 3 hours
	Warm-up Time	Not applicable
	Power Supply	Internal battery

Calibration Results

Calibration data were detailed in the continuation pages.  
All calibration results were within EUT specification.

### Approved By & Date

K.O. Lo

1-Feb-2016

### Statements

- \* Calibration equipment used for this calibration are traceable to national / international standards.
- \* The results on this Calibration Certificate only relate to the values measured at the time of the calibration and the uncertainties quoted will not include allowance for the EUT long term drift, variation with environmental changes, vibration and shock during transportation, overloading, mishandling, misuse, and the capacity of any other laboratory to repeat the measurement.
- \* MaxLab Calibration Centre Limited shall not be liable for any loss or damage resulting from the use of the EUT.
- \* The copy of this Certificate is owned by MaxLab Calibration Centre Limited. No part of this Certificate may be reproduced without the prior written approval of MaxLab Calibration Centre Limited.





# MAXLAB

Certificate No. MLCN160236S

<i>Calibration Data</i>					
EUT Setting		Standard Reading	EUT Error	Calibration Uncertainty	EUT Specification
94	dB	93.7 dB	0.3 dB	0.15 dB	± 0.3 dB
114	dB	113.7 dB	0.3 dB	0.15 dB	± 0.3 dB

- END -

Calibrated By :  
Date :

Dan  
1-Feb-16

Checked By :  
Date :

K.O. Lo  
1-Feb-16

Page 2 of 2



# Calibration Certificate

Certificate No. **600701**

Page 1 of 2 Pages

**Customer :** Environmental Resources Management

**Address :** 16/F DCH Commercial Centre 25 Westlands Road Quarry Bay Hong Kong

**Order No. :** Q54386

**Date of receipt :** 22-Jan-16

## Item Tested

**Description :** Sound Level Calibrator

**Manufacturer :** Svantek

**I.D. :** --

**Model :** SV30A

**Serial No. :** 7971

## Test Conditions

**Date of Test :** 27-Jan-16

**Supply Voltage :** --

**Ambient Temperature :** (23 ± 3)°C

**Relative Humidity :** (50 ± 25) %

## Test Specifications

Calibration check.

Ref. Document/Procedure : Z02, IEC942.

## Test Results

All results were within the IEC 942 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	505317	NIM-PRC & SCL-HKSAR
S240	Sound Level Calibrator	500563	NIM-PRC & SCL-HKSAR
S041	Universal Counter	506951	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 :**   
Alan Chu

**Approved by :**   
Steve Kwan

**Date:** 27-Jan-16

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



# Calibration Certificate

Certificate No. 600701

Page 2 of 2 Pages

Results :

## 1. Level Accuracy

UUT Nominal Value (dB)	Measured Value (dB)	IEC 942 Class 1 Spec.
94	94.1	± 0.3 dB
114	114.1	

Uncertainty : ± 0.1 dB

## 2. Frequency

UUT Nominal Value	Measured Value	IEC 942 Class 1 Spec.
1 kHz	1 000 Hz	± 2 %

Uncertainty : ± 3.6 x 10<sup>-6</sup>

## 3. Level Stability : 0.0 dB

IEC 942 Class 1 Spec. : ± 0.1 dB

Uncertainty : ± 0.01 dB

## 4. Total Harmonic Distortion : < 0.3 %

IEC 942 Class 1 Spec. : < 3 %

Uncertainty : ± 2.3 % of reading

Remark : 1. UUT : Unit-Under-Test

2. The above measured values are the mean of 3 measurements.

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

4. Atmospheric Pressure : 1020 hPa.

----- END -----

Annex B2

## Photographs showing Measurement Locations



Annex B2a

Photographs showing  
Measurement Locations  
(WAB)



Annex B2a-1

Measurement Location at NSR11

DATE: 20/07/2016

Environmental  
Resources  
Management

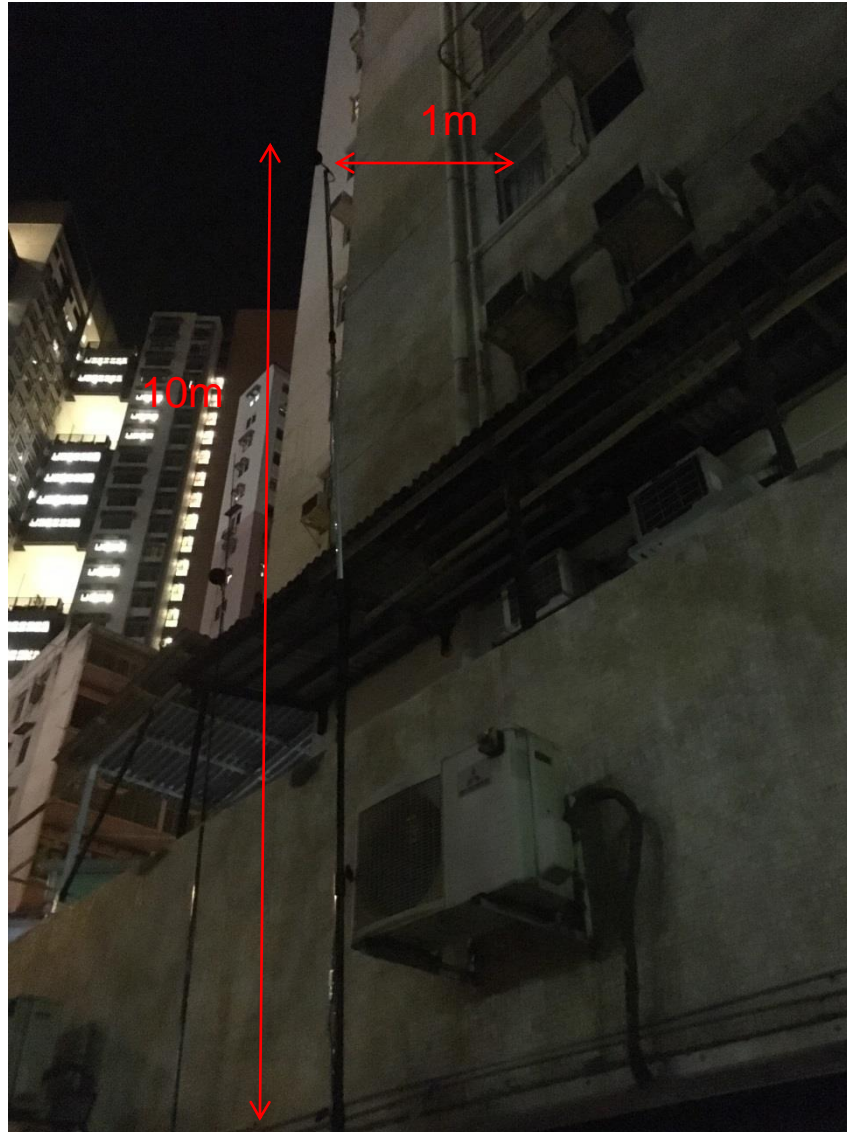




Annex B2b

Photographs showing  
Measurement Locations  
(HOM)





Annex B2b-1

Measurement Location at NSR18

DATE: 25/08/2016

Environmental  
Resources  
Management





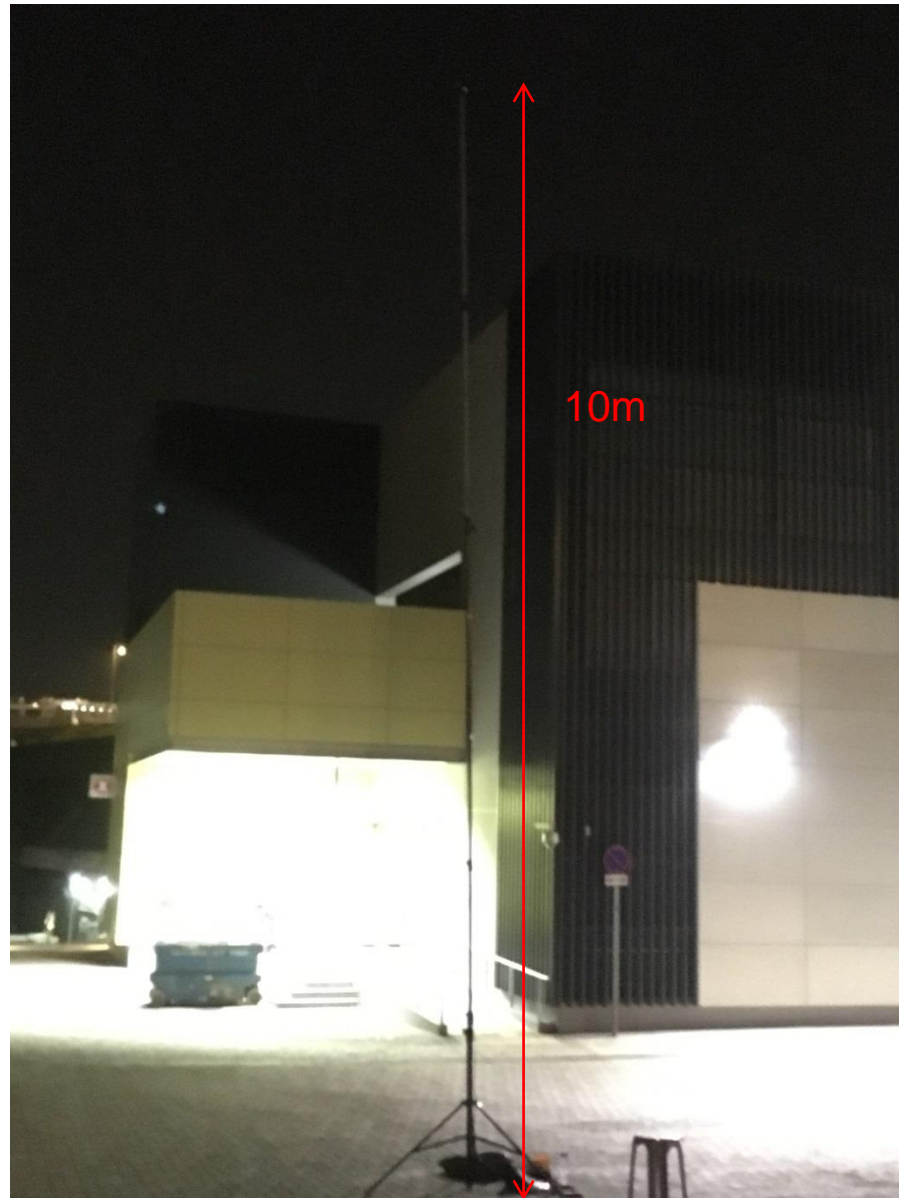
Annex B2b-2

Measurement Location at NSR20

DATE: 25/08/2016

Environmental  
Resources  
Management





Annex B2b-3

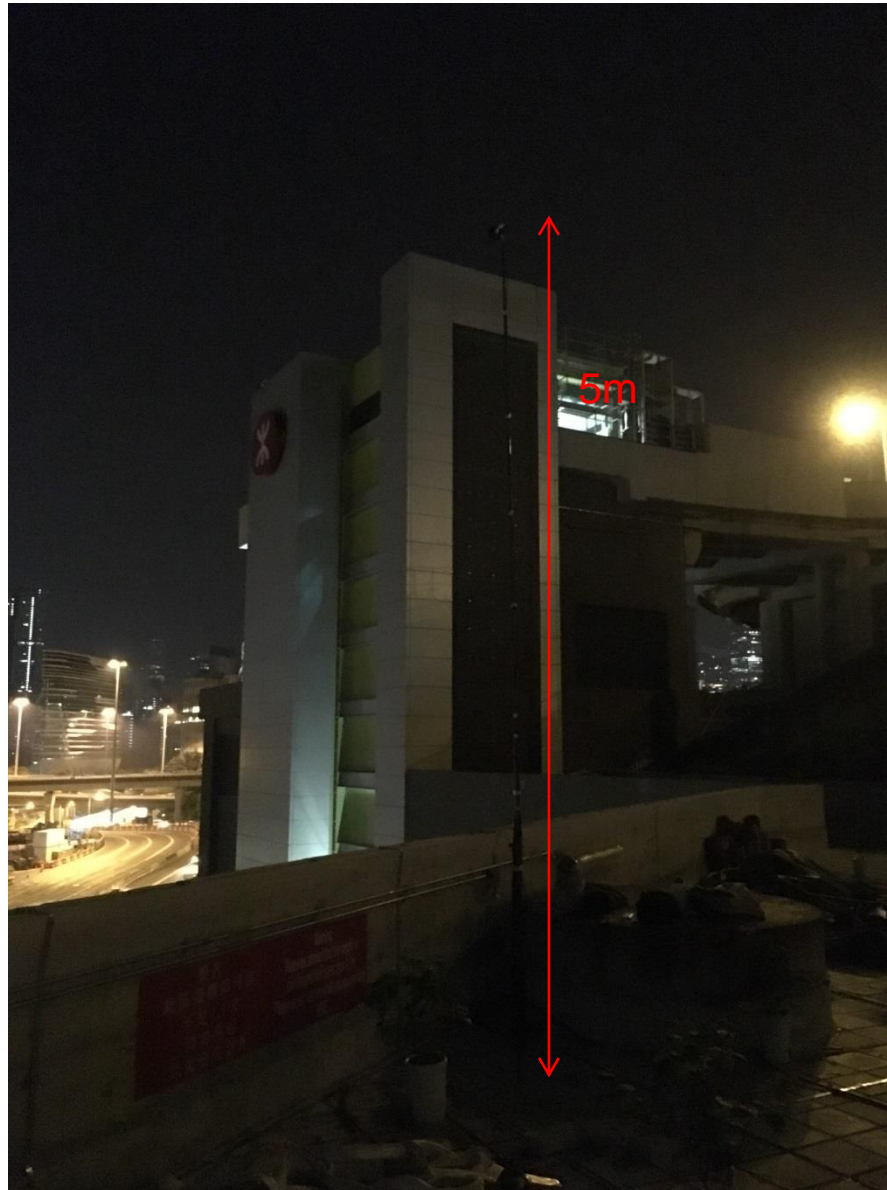
Measurement Location at NSR40b

DATE: 25/08/2016

Environmental  
Resources  
Management







Annex B2b-4

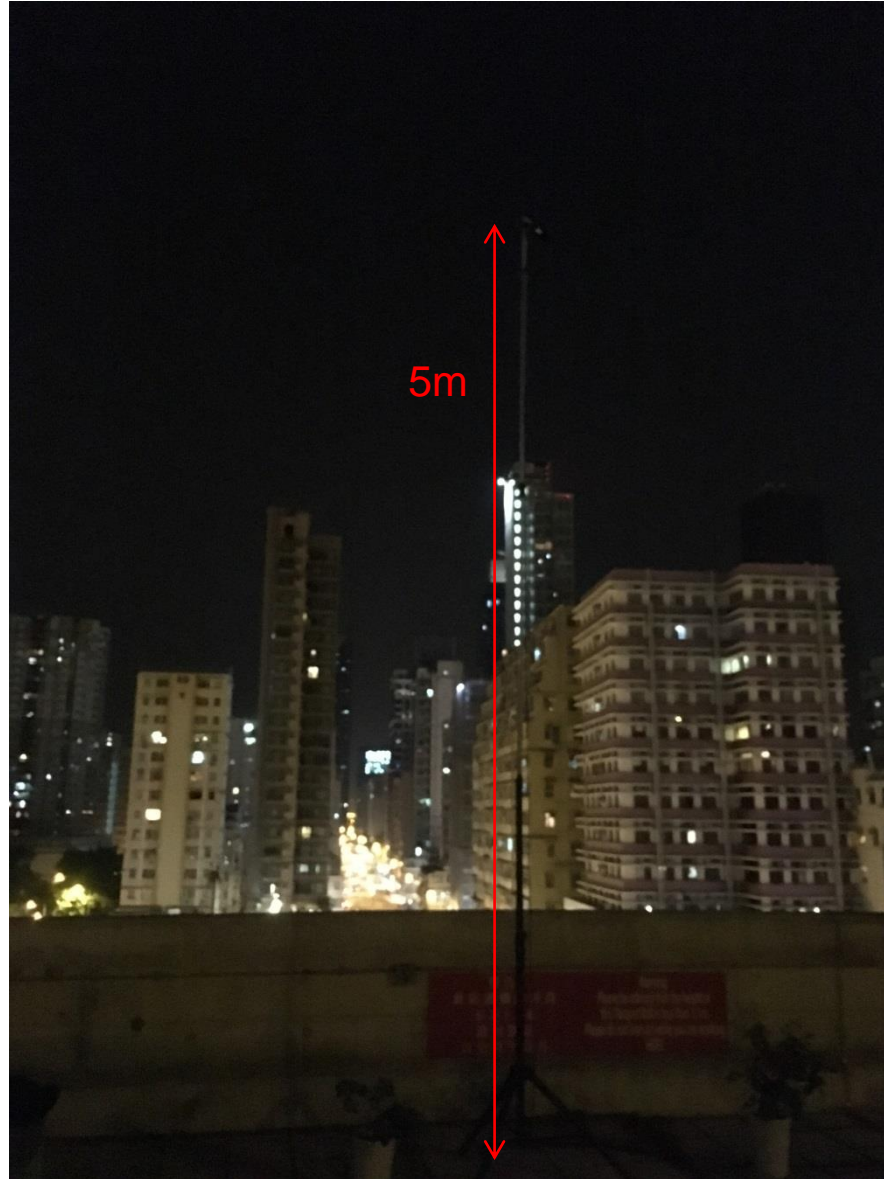
Measurement Location at NSR40c

DATE: 25/08/2016

Environmental  
Resources  
Management







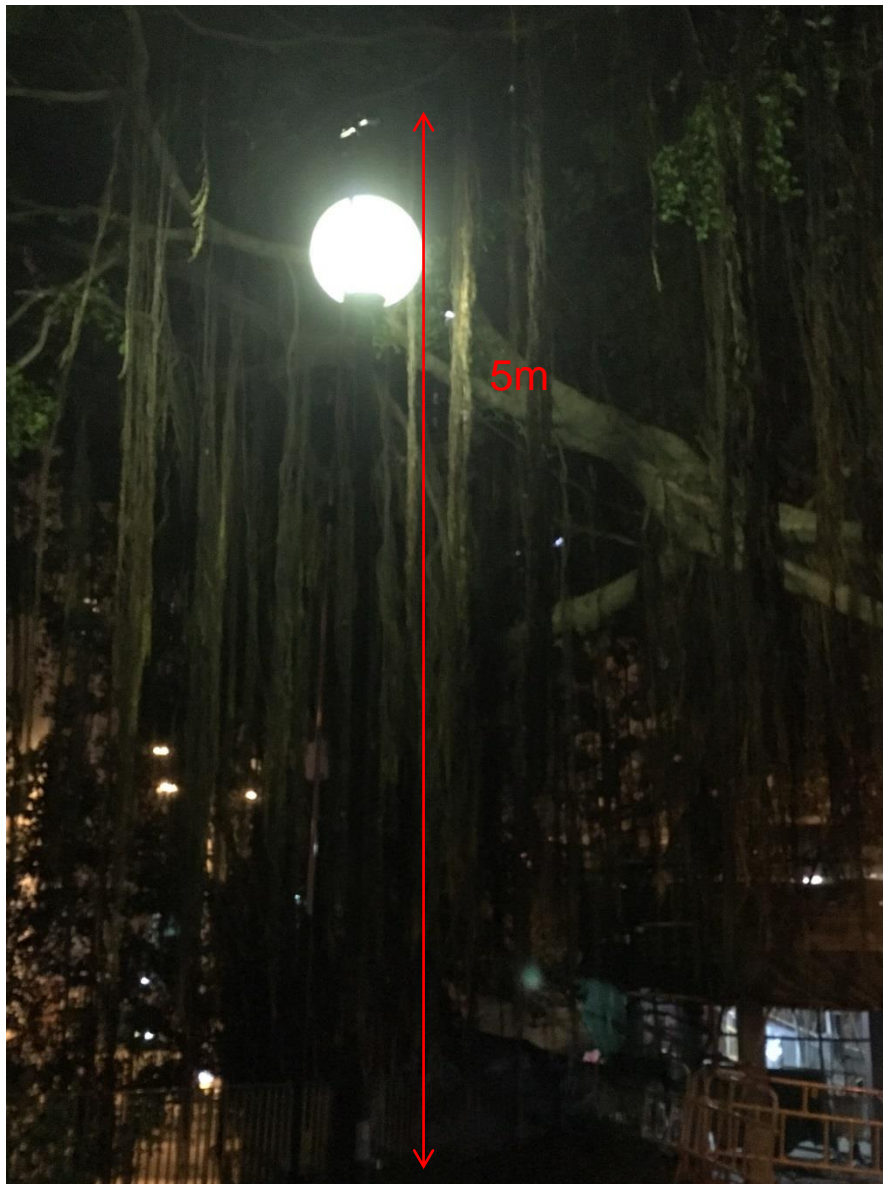
Annex B2b-5

Measurement Location at NSR40d

DATE: 25/08/2016

Environmental  
Resources  
Management





Annex B2c

Photographs showing  
Measurement Locations  
(WHA)



Annex B2c-1

Measurement Location at NSR27a

DATE: 25/08/2016

Environmental  
Resources  
Management







Annex B2c-2

Measurement Location at NSR28

DATE: 25/08/2016

Environmental  
Resources  
Management





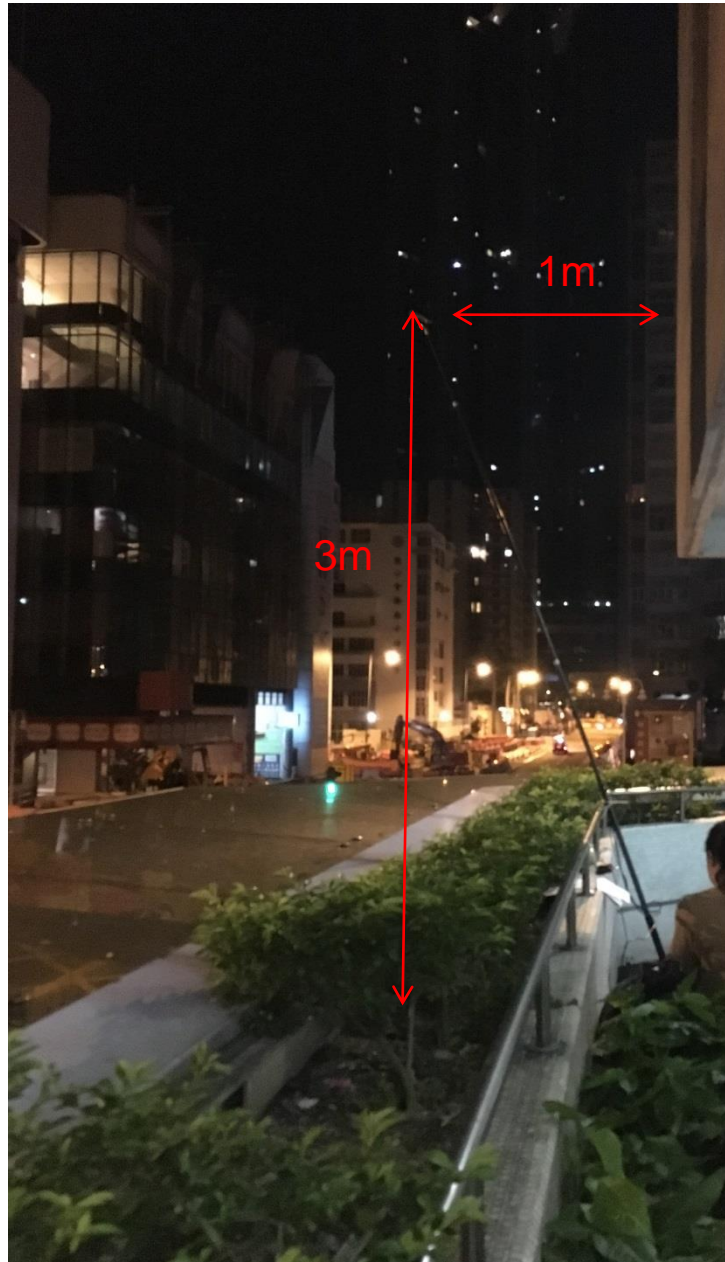
Annex B2c-3

Measurement Location at NSR29a

DATE: 25/08/2016

Environmental  
Resources  
Management





Annex B2c-4

Measurement Location at NSR31a

DATE: 25/08/2016

Environmental  
Resources  
Management







Annex B2c-5

Measurement Location at NSR32

DATE: 25/08/2016

Environmental  
Resources  
Management







Annex B2c-6

Measurement Location at NSR34b

DATE: 25/08/2016

Environmental  
Resources  
Management





Annex B2c-7

Measurement Location at NSR47

DATE: 25/08/2016

Environmental  
Resources  
Management









Annex B2c-9

Measurement Location at NSR50

DATE: 25/08/2016

Environmental  
Resources  
Management







Annex B2c-10

Measurement Location at NSR51a

DATE: 25/08/2016

Environmental  
Resources  
Management



Annex B3

## Detailed Results of Noise Measurement

Location	NSR ID	Scenario	Background/Measured Noise Level	Start Time	End Time	L <sub>eq</sub> , dB(A)	L <sub>min</sub> , dB(A)	L <sub>max</sub> , dB(A)	L <sub>90</sub> , dB(A)	L <sub>10</sub> , dB(A)	
WAB	NSR 11	1	Background Noise Level	14/7/2016 21:39	14/7/2016 21:44	59.3	56.2	66.8	56.9	61.1	
				14/7/2016 22:49	14/7/2016 22:54	58.7	55.2	64.8	56.3	60.7	
				14/7/2016 22:54	14/7/2016 23:59	58.8	55.4	64.2	56.3	60.8	
		Measured Noise Level	14/7/2016 21:47	14/7/2016 22:17	60.0	56.9	73.5	58.0	61.4		
			14/7/2016 22:17	14/7/2016 22:47	60.0	56.6	69.0	58.0	61.6		
			14/7/2016 23:55	15/7/2016 0:00	58.7	54.7	66.7	56.6	60.4		
	2	Background Noise Level	15/7/2016 1:37	15/7/2016 1:42	56.2	51.6	63.5	52.9	58.3		
			15/7/2016 1:42	15/7/2016 1:47	56.8	51.5	62.0	53.8	58.9		
			15/7/2016 0:34	15/7/2016 1:04	57.7	53.0	67.1	54.9	59.6		
	Measured Noise Level	15/7/2016 1:05	15/7/2016 1:35	57.5	52.5	74.4	54.7	59.1			
		14/7/2016 19:50	14/7/2016 19:55	69.5	57.9	79.8	61.5	72.4			
		14/7/2016 21:08	14/7/2016 21:13	71.2	57.7	82.9	60.7	74.2			
	NSR 12	1	Background Noise Level	14/7/2016 21:13	14/7/2016 21:18	69.2	57.0	76.9	60.2	72.4	
				14/7/2016 20:01	14/7/2016 20:31	68.8	57.0	78.2	60.1	72.1	
				14/7/2016 20:36	14/7/2016 21:06	69.4	56.2	85.3	59.2	72.9	
		2	Background Noise Level	15/7/2016 2:04	15/7/2016 2:09	63.9	54.8	76.3	59.3	68.4	
				15/7/2016 3:16	15/7/2016 3:21	61.1	53.7	72.8	54.1	66.2	
				15/7/2016 3:21	15/7/2016 3:26	63.0	53.6	76.4	54.5	67.8	
	Measured Noise Level	15/7/2016 2:12	15/7/2016 2:42	64.6	53.5	78.1	54.5	69.2			
		15/7/2016 2:43	15/7/2016 3:13	63.5	53.2	79.7	54.5	67.6			
		26/8/2016 1:14	26/8/2016 1:19	58.4	55.9	63.2	57.6	59.3			
	HOM	NSR 18	1	Background Noise Level	26/8/2016 1:19	26/8/2016 1:24	58.3	56.5	61.9	57.3	59.4
					26/8/2016 1:24	26/8/2016 1:29	58.5	56.1	67.1	57.3	59.6
					26/8/2016 2:13	26/8/2016 2:43	58.2	55.8	68.6	57.2	59.2
Measured Noise Level			26/8/2016 2:43	26/8/2016 3:13	57.8	55.4	63.8	56.8	58.9		
			26/8/2016 5:01	26/8/2016 5:06	56.9	54.6	61.0	55.7	58.1		
			26/8/2016 5:06	26/8/2016 5:11	56.8	54.5	60.3	55.8	57.9		
2		Background Noise Level	26/8/2016 5:11	26/8/2016 5:16	57.5	54.5	72.1	55.9	58.5		
			26/8/2016 3:41	26/8/2016 4:11	57.4	54.1	75.2	55.8	58.2		
			26/8/2016 4:11	26/8/2016 4:41	57.0	54.0	63.0	55.7	58.3		
NSR 20		1	Background Noise Level	26/8/2016 0:37	26/8/2016 0:42	78.7	67.1	89.9	74.7	81.0	
				26/8/2016 0:44	26/8/2016 0:49	78.4	69.4	86.2	73.3	80.9	
				26/8/2016 0:50	26/8/2016 0:55	78.4	67.3	90.6	73.1	80.9	
		Measured Noise Level	26/8/2016 2:18	26/8/2016 2:48	76.7	61.5	91.5	71.1	79.6		
			26/8/2016 2:48	26/8/2016 3:18	76.5	58.1	94.4	69.5	79.5		
			26/8/2016 5:03	26/8/2016 5:08	76.5	63.9	84.9	69.2	79.8		
2		Background Noise Level	26/8/2016 5:08	26/8/2016 5:13	76.5	63.0	85.7	68.5	79.9		
			26/8/2016 5:14	26/8/2016 5:19	76.3	63.8	87.2	68.7	79.5		
			26/8/2016 3:44	26/8/2016 4:14	76.4	56.6	102.4	66.9	78.8		
Measured Noise Level		26/8/2016 4:14	26/8/2016 4:44	75.8	57.5	87.8	67.8	79.2			
		26/8/2016 1:05	26/8/2016 1:10	56.2	54.0	61.3	54.5	57.5			
		26/8/2016 1:10	26/8/2016 1:15	56.9	53.0	63.6	54.5	59.0			
NSR 40b		1	Background Noise Level	26/8/2016 1:15	26/8/2016 1:20	56.5	54.5	60.9	55.0	58.0	
				26/8/2016 2:15	26/8/2016 2:45	56.9	54.5	67.2	55.0	58.0	
				26/8/2016 2:45	26/8/2016 3:15	56.8	54.5	70.5	55.0	58.0	
	2	Background Noise Level	26/8/2016 5:05	26/8/2016 5:10	55.2	52.0	62.3	53.0	57.0		
			26/8/2016 5:10	26/8/2016 5:15	57.9	52.0	66.7	54.0	61.0		
			26/8/2016 5:15	26/8/2016 5:20	56.0	52.5	61.6	53.5	58.0		
Measured Noise Level	26/8/2016 3:45	26/8/2016 4:15	55.9	52.0	72.6	53.0	57.5				
	26/8/2016 4:15	26/8/2016 4:45	56.8	52.5	70.2	53.5	58.5				
	26/8/2016 1:15	26/8/2016 1:20	66.9	62.5	70.5	64.9	68.1				
NSR 40c	1	Background Noise Level	26/8/2016 1:20	26/8/2016 1:25	66.3	61.0	69.7	63.3	67.7		
			26/8/2016 1:25	26/8/2016 1:30	66.2	61.5	72.0	63.2	67.9		
			26/8/2016 2:15	26/8/2016 2:45	65.9	58.6	72.3	63.1	67.8		
	2	Background Noise Level	26/8/2016 2:45	26/8/2016 3:15	65.5	57.2	74.1	62.2	67.5		
			26/8/2016 5:02	26/8/2016 5:07	65.3	58.9	70.2	61.9	67.3		
			26/8/2016 5:07	26/8/2016 5:12	65.2	56.5	69.5	61.3	67.3		
Measured Noise Level	26/8/2016 5:12	26/8/2016 5:17	65.4	58.9	69.5	62.2	67.2				
	26/8/2016 3:41	26/8/2016 4:11	65.7	55.5	87.5	60.5	66.8				
	26/8/2016 4:11	26/8/2016 4:41	65.0	56.7	72.3	61.1	67.1				
NSR 40d	1	Background Noise Level	26/8/2016 0:48	26/8/2016 0:53	67.3	59.9	76.6	64.6	68.8		
			26/8/2016 0:53	26/8/2016 0:58	67.4	62.4	77.0	64.9	68.8		
			26/8/2016 0:59	26/8/2016 1:04	67.1	62.0	74.1	64.2	68.7		
	2	Background Noise Level	26/8/2016 2:14	26/8/2016 2:44	66.6	61.2	74.7	64.2	68.3		
			26/8/2016 2:46	26/8/2016 3:16	66.2	60.6	76.9	63.6	67.9		
			26/8/2016 5:03	26/8/2016 5:08	65.2	57.6	70.4	61.4	67.3		
Measured Noise Level	26/8/2016 5:08	26/8/2016 5:13	65.5	58.1	73.0	61.7	67.5				
	26/8/2016 5:13	26/8/2016 5:18	65.5	57.8	71.2	61.9	67.3				
	26/8/2016 3:42	26/8/2016 4:12	65.4	53.8	87.6	60.2	66.7				
NSR 45	1	Background Noise Level	26/8/2016 4:12	26/8/2016 4:42	64.7	52.8	73.1	60.6	67.1		
			26/8/2016 0:35	26/8/2016 0:40	64.7	58.4	70.5	62.4	66.4		
			26/8/2016 0:40	26/8/2016 0:45	64.8	59.1	72.1	62.5	66.6		
	2	Background Noise Level	26/8/2016 0:48	26/8/2016 0:53	65.0	57.6	81.7	61.5	66.4		
			26/8/2016 2:14	26/8/2016 2:44	63.0	46.3	74.4	59.9	65.0		
			26/8/2016 2:44	26/8/2016 3:14	62.7	55.7	73.3	59.3	64.9		
Measured Noise Level	26/8/2016 4:44	26/8/2016 4:49	61.1	54.2	68.8	57.7	63.4				
	26/8/2016 5:03	26/8/2016 5:08	62.3	52.6	69.2	58.6	64.7				
	26/8/2016 5:08	26/8/2016 5:13	62.5	56.3	68.6	58.8	64.6				
Measured Noise Level	26/8/2016 3:42	26/8/2016 4:12	63.1	52.7	87.4	57.5	64.4				
	26/8/2016 4:13	26/8/2016 4:43	62.0	53.0	71.2	57.9	64.6				

WHA	NSR 27a	1	Background Noise Level	23/8/2016 1:35	23/8/2016 1:40	61.0	56.5	72.7	57.5	63.5
				23/8/2016 1:40	23/8/2016 1:45	61.5	56.5	78.0	56.5	63.5
				23/8/2016 5:40	23/8/2016 5:45	61.5	57.0	74.8	57.5	64.0
		Measured Noise Level	23/8/2016 2:43	23/8/2016 3:13	61.5	57.0	79.7	57.5	64.0	
			23/8/2016 3:18	23/8/2016 3:48	61.4	56.5	82.9	57.0	63.5	
			23/8/2016 5:45	23/8/2016 5:50	70.0	58.0	83.6	59.5	73.5	
		2	Background Noise Level	23/8/2016 5:50	23/8/2016 5:55	62.8	57.0	73.1	57.5	66.5
				23/8/2016 5:55	23/8/2016 6:00	62.2	57.0	75.5	57.0	66.0
				23/8/2016 4:30	23/8/2016 5:00	60.0	56.0	78.0	56.5	61.5
		Measured Noise Level	23/8/2016 5:08	23/8/2016 5:38	65.4	56.5	89.1	57.0	67.0	
	23/8/2016 5:08		23/8/2016 5:38	65.4	56.5	89.1	57.0	67.0		
	23/8/2016 5:08		23/8/2016 5:38	65.4	56.5	89.1	57.0	67.0		
	NSR 28	1	Background Noise Level	23/8/2016 1:42	23/8/2016 1:47	55.0	51.4	55.9	51.7	65.5
				23/8/2016 1:48	23/8/2016 1:53	55.2	45.1	61.2	52.8	56.8
				23/8/2016 1:54	23/8/2016 1:59	55.7	48.2	66.4	52.5	57.2
			Measured Noise Level	23/8/2016 2:45	23/8/2016 3:15	57.5	49.1	71.9	55.2	58.4
				23/8/2016 3:15	23/8/2016 3:45	57.7	46.5	72.6	55.3	58.7
		2	Background Noise Level	23/8/2016 5:36	23/8/2016 5:41	59.4	54.6	63.2	56.6	61.7
				23/8/2016 5:41	23/8/2016 5:46	59.4	55.1	67.4	56.9	62.1
				23/8/2016 5:46	23/8/2016 5:51	60.5	53.9	68.0	57.3	62.7
			Measured Noise Level	23/8/2016 4:31	23/8/2016 5:01	55.6	50.7	69.2	52.8	56.8
				23/8/2016 5:02	23/8/2016 5:32	58.5	49.4	84.2	53.6	58.9
	NSR 29a	1	Background Noise Level	23/8/2016 1:55	23/8/2016 2:00	60.6	56.9	70.1	57.4	63.1
				23/8/2016 5:35	23/8/2016 5:40	60.2	56.5	68.0	56.8	62.9
				23/8/2016 5:41	23/8/2016 5:46	60.0	56.4	71.9	56.9	62.8
			Measured Noise Level	23/8/2016 2:43	23/8/2016 3:13	61.4	57.9	78.0	58.3	62.6
				23/8/2016 3:14	23/8/2016 3:44	62.0	58.0	82.3	58.3	62.6
		2	Background Noise Level	23/8/2016 5:46	23/8/2016 5:51	65.1	56.8	75.7	57.8	68.6
				23/8/2016 5:51	23/8/2016 5:56	62.4	56.7	73.8	57.4	65.8
				23/8/2016 5:57	23/8/2016 6:02	62.2	56.6	73.0	57.2	64.7
			Measured Noise Level	23/8/2016 4:29	23/8/2016 4:59	60.8	56.7	74.5	57.1	62.5
				23/8/2016 5:00	23/8/2016 5:30	64.7	56.6	89.5	56.9	64.6
	NSR 31a	1	Background Noise Level	23/8/2016 2:07	23/8/2016 2:12	58.6	55.0	70.8	55.8	61.0
				23/8/2016 2:12	23/8/2016 2:17	62.0	55.1	75.1	56.0	65.1
				23/8/2016 5:35	23/8/2016 5:40	61.3	54.6	76.6	55.5	63.7
			Measured Noise Level	23/8/2016 2:43	23/8/2016 3:13	58.0	55.0	73.6	55.5	59.9
				23/8/2016 3:14	23/8/2016 3:44	57.7	54.9	76.6	55.4	59.2
		2	Background Noise Level	23/8/2016 5:40	23/8/2016 5:45	58.2	54.5	66.3	55.2	61.0
				23/8/2016 5:45	23/8/2016 5:50	62.7	54.8	74.0	55.8	66.2
				23/8/2016 5:50	23/8/2016 5:55	59.0	54.8	80.3	55.5	61.5
			Measured Noise Level	23/8/2016 4:28	23/8/2016 4:58	58.2	54.4	81.0	55.1	60.1
				23/8/2016 4:58	23/8/2016 5:28	59.9	54.5	79.2	55.3	62.3
	NSR 32	1	Background Noise Level	23/8/2016 2:05	23/8/2016 2:10	57.6	52.9	71.5	54.0	59.6
				23/8/2016 2:19	23/8/2016 2:24	56.8	52.9	69.0	53.8	58.6
				23/8/2016 5:31	23/8/2016 5:36	58.3	52.4	69.3	53.5	61.3
			Measured Noise Level	23/8/2016 2:44	23/8/2016 3:14	56.1	53.0	71.6	53.9	57.8
				23/8/2016 3:17	23/8/2016 3:47	55.7	52.8	70.8	53.8	56.8
		2	Background Noise Level	23/8/2016 5:42	23/8/2016 5:47	56.7	52.3	74.2	53.2	59.2
				23/8/2016 5:47	23/8/2016 5:52	60.6	52.5	75.4	53.6	62.6
				23/8/2016 5:52	23/8/2016 5:57	57.2	52.8	72.3	53.6	59.3
			Measured Noise Level	23/8/2016 4:30	23/8/2016 5:00	55.6	52.2	71.4	53.0	57.1
				23/8/2016 5:01	23/8/2016 5:31	58.1	52.5	77.3	53.3	60.3
	NSR 34b	1	Background Noise Level	23/8/2016 2:20	23/8/2016 2:25	52.0	50.5	61.1	50.7	52.9
				23/8/2016 2:25	23/8/2016 2:30	55.3	50.6	61.4	50.8	56.3
				23/8/2016 2:35	23/8/2016 2:40	58.0	55.3	70.7	55.9	57.9
			Measured Noise Level	23/8/2016 2:45	23/8/2016 3:15	57.0	55.2	64.8	55.9	57.5
				23/8/2016 3:15	23/8/2016 3:45	56.8	54.9	66.7	55.8	57.2
		2	Background Noise Level	23/8/2016 5:40	23/8/2016 5:45	57.9	53.6	66.5	54.2	61.9
				23/8/2016 5:45	23/8/2016 5:50	59.1	55.9	64.3	57.3	60.5
				23/8/2016 5:50	23/8/2016 5:55	57.8	56.6	68.1	56.7	58.5
			Measured Noise Level	23/8/2016 4:30	23/8/2016 5:00	53.7	51.7	65.3	51.8	54.2
				23/8/2016 5:00	23/8/2016 5:30	56.6	51.9	69.6	52.3	59.8
	NSR 47	1	Background Noise Level	23/8/2016 1:55	23/8/2016 2:00	62.5	59.1	73.0	59.5	64.9
				23/8/2016 5:35	23/8/2016 5:40	61.6	58.6	71.9	58.9	63.2
				23/8/2016 5:41	23/8/2016 5:46	62.2	58.5	72.1	58.7	65.2
			Measured Noise Level	23/8/2016 2:43	23/8/2016 3:13	62.9	60.1	77.5	60.4	63.9
				23/8/2016 3:14	23/8/2016 3:44	63.1	60.0	76.2	60.3	64.8
		2	Background Noise Level	23/8/2016 5:46	23/8/2016 5:51	64.9	59.7	74.1	60.2	68.1
				23/8/2016 5:52	23/8/2016 5:57	63.6	59.1	76.2	59.3	66.2
				23/8/2016 5:57	23/8/2016 6:02	63.9	58.7	75.6	59.3	66.7
			Measured Noise Level	23/8/2016 4:29	23/8/2016 4:59	61.8	58.5	76.7	58.8	62.6
				23/8/2016 5:00	23/8/2016 5:30	65.4	56.9	89.6	57.4	63.8
	NSR 48a	1	Background Noise Level	23/8/2016 1:39	23/8/2016 1:44	57.9	51.6	66.2	54.7	60.5
				23/8/2016 1:44	23/8/2016 1:49	57.3	53.5	75.2	54.1	58.7
				23/8/2016 1:49	23/8/2016 1:54	56.3	53.1	63.1	54.2	58.1
			Measured Noise Level	23/8/2016 2:46	23/8/2016 3:16	59.9	51.4	75.9	57.9	60.7
				23/8/2016 3:17	23/8/2016 3:47	59.5	47.8	75.8	57.9	60.2
		2	Background Noise Level	23/8/2016 5:36	23/8/2016 5:41	59.7	55.7	75.4	56.3	62.2
				23/8/2016 5:41	23/8/2016 5:46	59.0	55.8	69.0	56.2	61.2
				23/8/2016 5:46	23/8/2016 5:51	57.8	55.8	66.2	56.2	59.2
			Measured Noise Level	23/8/2016 4:29	23/8/2016 4:59	55.6	51.6	71.7	53.5	56.8
				23/8/2016 5:00	23/8/2016 5:30	59.1	50.0	83.3	53.7	59.2
	NSR 50	1	Background Noise Level	23/8/2016 1:47	23/8/2016 1:52	58.6	52.1	78.3	52.9	59.0
				23/8/2016 2:12	23/8/2016 2:17	56.3	52.2	73.9	52.9	56.9
				23/8/2016 5:42	23/8/2016 5:47	58.6	52.7	79.3	53.5	58.9
			Measured Noise Level	23/8/2016 2:44	23/8/2016 3:14	56.6	53.1	77.9	53.7	56.1
				23/8/2016 3:15	23/8/2016 3:45	56.1	52.7	78.2	53.6	56.0
		2	Background Noise Level	23/8/2016 5:47	23/8/2016 5:52	58.8	53.9	75.3	54.8	61.7
				23/8/2016 5:52	23/8/2016 5:57	59.5	54.1	79.5	55.0	61.4
				23/8/2016 5:58	23/8/2016 6:03	61.7	54.0	79.0	54.9	66.0
			Measured Noise Level	23/8/2016 4:30	23/8/2016 5:00	56.8	52.4	80.3	53.1	55.6
				23/8/2016 5:00	23/8/2016 5:30	60.1	52.4	81.6	53.4	59.7
	NSR 51a	1	Background Noise Level	23/8/2016 1:39	23/8/2016 1:44	60.5	54.7	76.2	55.6	62.2
				23/8/2016 1:51	23/8/2016 1:56	58.1	54.3	76.2	55.1	58.1
				23/8/2016 5:33	23/8/2016 5:38	56.8	54.4	63.8	55.1	59.4
			Measured Noise Level	23/8/2016 2:46	23/8/2016 3:16	56.8	54.0	74.2	55.1	58.7
				23/8/2016 3:16	23/8/2016 3:46	56.6	53.9	66.6	55.2	58.7
		2	Background Noise Level	23/8/2016 5:38	23/8/2016 5:43	56.8	54.2	64.4	55.0	59.2
				23/8/2016 5:43	23/8/2016 5:48	56.4	54.1	65.0	55.1	59.0
				23/8/2016 5:49	23/8/2016 5:54	57.2	54.5	63.7	55.3	59.7
Measured Noise Level			23/8/2016 4:28	23/8/2016 4:58	56.9	54.1	74.9	55.0	58.5	
			23/8/2016 4:58	23/8/2016 5:28	57.5	54.1	71.8	55.1	59.0	