

Technical Data

Attachment 4 - 9 pages

Fleet Vertical

Boilers

- Three High Modules

	Model	F175V-525	F200V-600	F250V-750	F300V-900	F350V-1050
Energy	Building Regulations seasonal efficiency gross (%)	95.5	95.5	95.5	95.5	97.4
	Boiler output 50/30°C kW Btu/h x 1000	525 1791	600 2047	750 2559	900 3071	1050 3583
	Boiler output 80/60°C kW Btu/h x 1000	474.9 1620	542.7 1852	678.6 2315	814.2 2778	949.8 3241
	Boiler input (gross) Maximum kW Btu/h x 1000	539.5 1841	616.6 2104	770.7 2630	924.9 3156	1079 3682
	Boiler input (nett) Maximum kW Btu/h x 1000	486.1 1659	555.6 1896	694.2 2369	833.4 2844	972.3 3317
	Boiler output Minimum 80/60°C kW Btu/h x 1000	31.7 108	36.2 124	45.2 154	54.3 185	63.3 216
Water	Water content (not including headers) litres	39	45	51	60	75
	Design flow rate @ 20°C Δt rise l/s	6.3	7.2	9.0	10.8	12.6
	Residual pump head @ 20°C Δt rise kPa m	27 2.7	20 2	14 1.4	42 4.2	34 3.4
	Maximum water pressure barg	6.0				
Gas	Gas flow rate natural gas (G20) – Maximum m³/h	51.3	65.1	73.2	87.9	102.6
	Gas inlet pressure natural gas (G20) mbar	17.5 Minimum 20.0 Nominal 25.0 Maximum				
Flue	Approx. Flue gas volume @ 15°C, 9.2% CO ₂ , N.T.P m³/h	675	780	975	1170	1350
	Maximum flue gas temperature °C	65				
	NO _x Emission (DAF) European Class 5 mg/kWh	56	56	47	60	40
	Pressure at flue outlet Pa mbar	150 1.5				
Connection	Water flow/return connections	R1½"			R2"	
	Gas inlet connections	R1"			R1¼"	
	Nominal flue manifold diameter (I/D) mm	200			250	
	Safety valves (pipe tail) mm	22				
	Condensate trap connection(s) (O/D) mm	40				
Electrics	Power consumption – maximum W	1680	1680	1650	1740	4500
	Nominal supply voltage	230V 1Ph 50Hz				
	Module current Start Amps Run Amps	3.5 2.2			3.7 2.5	8.5 6
	Approx. shipping weight kg	440	554	610	738	908
	Noise emission @ 1m Max dB (A)	62	62	53	66.5	72

1.2.4 GAS SUPPLY

The gas system accommodates a minimum and maximum gas pressure of 20/45mbar respectively. It is mounted within the acoustic enclosure and is connected by flexible pipes to the gas air mixer on the engine.

- Double solenoid shut-off valve;
- Low pressure switch;
- High pressure switch (optional);
- Zero pressure regulator;
- Start aid compensation;
- Flexible gas connection hose;
- Gas/air mixer;
- Gas filter (optional).

1.2.5 ENCLOSURE

The genset enclosure comprises of a steel frame with sound insulated panels and access doors. Ventilation air is drawn through a sound attenuator in the air inlet and pulled through the enclosure by a roof mounted fan.

The air intake arrangement has built in attenuators to achieve the design noise level, but the outlet connection does not have attenuation as standard. The standard enclosure ventilation fan is designed to accommodate some additional pressure loss external to the CHP unit. If additional pressure is required, a special fan will need to be fitted.

The enclosures are designed to achieve a standard 70dBA at 1m (free field conditions). Options are available for 65 dBA by specific request.

Ductwork carries expelled air from the enclosure fan to an outdoor vent. It may be necessary to install additional attenuation in this ductwork to achieve specific noise levels at the air intake and air discharge louvres. Combustion air is drawn independently into the engine through a filter and a dedicated combustion air attenuator located on the top of the enclosure.

The enclosure has an integrated oil bund to contain oil spillage with no floor penetrations.

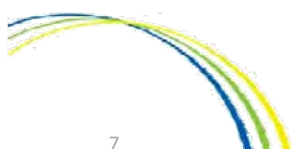
Ventilation and Combustion Air Data

- | | |
|------------------------------------|----------------------|
| • Maximum ambient temperature | 35°C |
| • Ventilation air volume flow rate | 1.6m ³ /s |
| • Combustion air volume flow rate | 199m ³ /s |

1.3 CONTROL AND PROTECTION

The unit control and electrical system is installed in a cabinet that forms part of the enclosure. It is specially designed to control and protect the ENER-G CHP unit. Principal areas of control are:

- Electric output;
- Heat;
- Import and export interface with grid;
- Electrical isolation.



ENER-G COMBINED POWER TECHNICAL DATA SHEET

E 70M

MECHANICAL DATA

Fuel Type Natural Gas CV = 10kWh/Nm³ Min Methane No = 80

Energy Balance and Part Load Data		Units	100%	75%	50%
Electrical Output	(+/-3%)	kW	70	53	36
Mechanical Efficiency	(+/-5%)	%	31.0%	30%	27%
Heat Output	(+/-8%)	kW	104	81	63
Thermal Efficiency	(+/-8%)	%	46.1%	46%	46%
Fuel Used (Nett)	(+/-5%)	kW	204	159	122
Fuel Used (Gross)	(+/-5%)	kW	226	176	135
Total Efficiency	(+/-8%)	%	77.1%	76%	73%
Heat Output from Jacket Water	(+/-8%)	kW	60	50	41
Heat Output from Exhaust Gasses	(+/-8%)	kW	44	32	22
Radiated Heat	(+/-8%)	kW	15	8	6
Combustion Air Flow	(+/-5%)	Nm ³ /h	199	153	117
Fuel Mass Flow	(+/-5%)	kg/h	15	12	9
Fuel Volume Flow	(+/-5%)	Nm ³ /h	23	16	12
Exhaust Gas Mass Flow	(+/-5%)	kg/h	272	209	160
Exhaust Volume Flow	(+/-5%)	Nm ³ /h	316	244	186

Engine Details

Type	Gas Engine
Combustion Cycle	4-stroke
Cylinders	6
Aspiration	Natural
Speed	1500 rpm
Intercooler	No

Secondary Water Circuit

Water Flow Rate*	2.49 l/s
CHP LTHW Connection Size	50 mm
Flange Type	16 PN
Pump Head Available (STD Pump)	75 kPa
@ CHP Flange (UPRTD Pump)	111 kPa
Max. Static Pressure	8 Bar
Max. Return Water Temp.	90/80°C
Ethylene Glycol Content	0 %

Intercooler Water Circuit

- Does Not Apply to this Unit.

Water Flow Rate	N/A
Connection Size	mm
Ethylene Glycol Content	%
Safety Relief Valve Set Point	Bar

Ventilation Details

Fan Diameter	mm
Ventilation Rate	m ³ /s
Head Available (Standard Fan)	Pa
Head Available (Up-rated Fan)	Pa
Max. Ambient Temp.	35 °C

Gas Details

Gas Connection Size	mm
Flange Type	PN
Gas Flow Rate	m ³ /h
Gas Pressure Min/Max	mBar

Electrical Details

Connections	400V/3Ph/50Hz
F.L.C. @ Unit Rated Output (0.8/0.95 PF)	126/106 A

Generator Details

Model	UCI274E
Type	Synchronous
Voltage	400 V
Rating @ 0.8PF	140 kVA
Current PerPhase @ 0.8PF	202 A
Efficiency	94.1 %
Protection Class	IP23
Xd Dir. Axis Synchronous	2.11
X'd Dir. Axis Transient	0.19
X''d Dir. Axis Sub-Transient	0.13
T'' Sub-Transient Time Const.	0.01
T'do O.C Field Time Const.	0.85

Exhaust Details

Mass Flow Rate	kg/h
Outlet Temperature	272 °C
Connection Size	mm
Flange Rating	Table D
Max. Allowable Backpressure***	2000 Pa

Pipe Dimensions

Secondary Water Circuit (ØA)	mm
Intercooler Water Circuit (ØB)	mm
Gas Circuit (ØC)	mm
Exhaust Circuit (ØD)	mm
Vent Outlet Circuit (ØE)	mm
Frost Pump Circuit (ØF)	mm

Noise Data

Exhaust Noise Level (Std/Uprrtd)***	60/70 dBA
Radiator Noise Level @ 1m.....	66 dBA

Miscellaneous Data

Glycol Content in Engine	%
Unit Weight (Standard Enclosure)	kg

Emissions (Based on 5% O2)

NOx	mg/m ³
CO	mg/m ³
NOx	mg/m ³
CO	mg/m ³

N.B Combustion Air and Exhaust data assume perfect combustion. Values are directive only and does not guarantee values for individual gas engines. Values for part load data are estimates only. ¹. Within the circuit between primary and secondary PHE if secondary PHE is required.

*Based on a 10°C Temperature Rise

** For Lengths Less than 50m subject to installation method

*** After Primary and Secondary Silencers

CABLE SCHEDULE

CLIENT PROTECTION DEVICE				140A		
Cable Ref.	Type	Size (mm ²)	No. of Cores	Max Length	Installation Ref.	Usage
CPL/E001	XLPE/SWA/PVC	70	4	50M	ON CABLE TRAY	MAIN POWER
CPL/E002	PVC	35	1	50M	ON CABLE TRAY	MAIN EARTH
CPL/C003	XLPE/SWA/PVC	1.5	12	20M	SEGREGATED FROM POWER	BMS
CPL/P004	SY	1.5	4	20M	ON CABLE TRAY	ENCLOSURE VENT FAN
CPL/P005	XLPE/SWA/PVC	1.5	4	20M	SEGREGATED FROM POWER	GAS BOOSTER
CPL/C006	SWA SCREENED TWISTED	0.75	2	20M	SEGREGATED FROM POWER	GAS METER PULSE
CPL/P007	XLPE/SWA/PVC	1.5	4	20M	ON CABLE TRAY	INTERCOOLER PUMP
CPL/P008	XLPE/SWA/PVC	1.5	3	20M	ON CABLE TRAY	INTERCOOLER PRESSURISATION UNIT
CPL/C009	XLPE/SWA/PVC	1.5	4	20M	SEGREGATED FROM POWER	INTERCOOLER PRESSURISATION UNIT
CPL/P010	XLPE/SWA/PVC	2.5	4	20M	ON CABLE TRAY	TCI CONTROL PANEL POWER
CPL/C011	XLPE/SWA/PVC	1.5	4	20M	SEGREGATED FROM POWER	TCI CONTROL PANEL CONTROL
CPL/C012	K TYPE THERMOCOUPLE	1	2	20M	SEGREGATED FROM POWER	T1 DUMP RETURN TEMPERATURE
CPL/C013	K TYPE THERMOCOUPLE	1	2	20M	SEGREGATED FROM POWER	T2 AMBIENT TEMPERATURE
CPL/C014	K TYPE THERMOCOUPLE	1	2	20M	SEGREGATED FROM POWER	T3 RETURN TEMPERATURE
CPL/C015	SWA SCREENED TWISTED	0.75	2	20M	SEGREGATED FROM POWER	HEAT METER PULSE
CPL/P016	XLPE/SWA/PVC	1.5	3	20M	ON CABLE TRAY	PRESSURISATION UNIT POWER
CPL/C017	XLPE/SWA/PVC	1.5	4	20M	SEGREGATED FROM POWER	PRESSURISATION UNIT CONTROL
CPL/C021	SWA SCREENED TWISTED	0.75	2	20M	SEGREGATED FROM POWER	POWER MODULATION
CPL/P022	XLPE/SWA/PVC	1.5	5	10M	ON CABLE TRAY	CLIENT VOLTAGE REFERENCE
CPL/C023	SWA SCREENED TWISTED	2.5	2	10M	SEGREGATED FROM POWER	L1 CURRENT SENSE
CPL/C024	SWA SCREENED TWISTED	2.5	2	10M	SEGREGATED FROM POWER	L2 CURRENT SENSE
CPL/C025	SWA SCREENED TWISTED	2.5	2	10M	SEGREGATED FROM POWER	L3 CURRENT SENSE
CPL/C026	SWA SCREENED TWISTED	2.5	2	10M	SEGREGATED FROM POWER	L1 CURRENT SENSE (2ND INCOMER)
CPL/C027	SWA SCREENED TWISTED	2.5	2	10M	SEGREGATED FROM POWER	L2 CURRENT SENSE (2ND INCOMER)
CPL/C028	SWA SCREENED TWISTED	2.5	2	10M	SEGREGATED FROM POWER	L3 CURRENT SENSE (2ND INCOMER)
CPL/P031	XLPE/SWA/PVC	1.5	4	20M	ON CABLE TRAY	SECONDARY WATER PUMP
CPL/C032	XLPE/SWA/PVC	1.5	5	20M	ON CABLE TRAY	SECONDARY WATER PUMP CONTROL
CPL/C033	SWA SCREENED TWISTED	0.75	2	20M	SEGREGATED FROM POWER	T5 CHP FLOW TEMPERATURE
CPL/P034	XLPE/SWA/PVC	1.5	4	20M	ON CABLE TRAY	SECONDARY WATER PUMP
CPL/C035	SWA SCREENED TWISTED	0.75	2	20M	SEGREGATED FROM POWER	T6 CHP MIX FLOW TEMPERATURE
CPL/C036	XLPE/SWA/PVC	1.5	4	20M	ON CABLE TRAY	HEAT CONTROL MOTORISED VALVE
CPL/P041	XLPE/SWA/PVC	2.5	4	20M	ON CABLE TRAY	POWER HEAT REJECTION
CPL/C042	XLPE/SWA/PVC	1.5	12	20M	SEGREGATED FROM POWER	CONTROL HEAT REJECTION
CPL/C043	XLPE/SWA/PVC	1.5	2	20M	SEGREGATED FROM POWER	HEATER THERMOSTAT
CPL/P044	XLPE/SWA/PVC	1.5	4	20M	ON CABLE TRAY	FROST PROTECTION HEATER
CPL/C045	XLPE/SWA/PVC	1.5	2	20M	SEGREGATED FROM POWER	FROST PUMP FLOW SWITCH
CPL/P046	XLPE/SWA/PVC	1.5	3	20M	ON CABLE TRAY	FROST PUMP
CPL/C047	XLPE/SWA/PVC	1.5	4	20M	ON CABLE TRAY	HEAT REJECTION MOTORISED VALVE
CPL/P048	XLPE/SWA/PVC	1.5	4	20M	ON CABLE TRAY	HEAT REJECTION FAN MOTOR 1
CPL/P049	XLPE/SWA/PVC	1.5	4	20M	ON CABLE TRAY	HEAT REJECTION FAN MOTOR 2
CPL/P050	XLPE/SWA/PVC	1.5	4	20M	ON CABLE TRAY	HEAT REJECTION FAN MOTOR 3
CPL/P051	XLPE/SWA/PVC	1.5	4	20M	ON CABLE TRAY	HEAT REJECTION FAN MOTOR 4
CPL/C052	CY	0.75	2	20M	SEGREGATED FROM POWER	T1 DUMP RETURN TEMPERATURE
CPL/C053	CY	0.75	2	20M	SEGREGATED FROM POWER	T2 AMBIENT TEMPERATURE
CPL/C054	CY	0.75	2	20M	SEGREGATED FROM POWER	T3 BUILDING RETURN TEMPERATURE
CPL/C055	CY	0.75	2	20M	SEGREGATED FROM POWER	T4 HEATING RETURN TEMPERATURE
CPL/P061	XLPE/SWA/PVC	1.5	4	20M	ON CABLE TRAY	FLUE DILUTION PANEL POWER
CPL/C062	XLPE/SWA/PVC	1.5	4	20M	SEGREGATED FROM POWER	FLUE DILUTION PANEL CONTROL
CPL/P063	XLPE/SWA/PVC	1.5	3	20M	ON CABLE TRAY	FLUE DILUTION FAN
CPL/C064	XLPE/SWA/PVC	1.5	2	20M	SEGREGATED FROM POWER	AIR FLOW SWITCH
CPL/C071	XLPE/SWA/PVC	1.5	7	50M	SEGREGATED FROM POWER	CHP ESSENTIAL CONTROL
CPL/C072	XLPE/SWA/PVC	1.5	5	50M	ON CABLE TRAY	NON-ESSENTIAL VOLTAGE SENSE
CPL/C073	XLPE/SWA/PVC	1.5	3	50M	ON CABLE TRAY	NON-ESSENTIAL BREAKER SENSE
CPL/C074	XLPE/SWA/PVC	1.5	5	50M	SEGREGATED FROM POWER	BUS COUPLER CONTROL
CPL/C075	XLPE/SWA/PVC	1.5	5	50M	ON CABLE TRAY	ESSENTIAL VOLTAGE SENSE
CPL/C076	XLPE/SWA/PVC	1.5	3	50M	SEGREGATED FROM POWER	ESSENTIAL BREAKER SENSE
CPL/C077	XLPE/SWA/PVC	1.5	5	50M	SEGREGATED FROM POWER	CHP INCOMER BREAKER SENSE
CPL/C078-89	XLPE/SWA/PVC	1.5	12	50M	SEGREGATED FROM POWER	ESSENTIAL MCCB CONTROL 1-12

GENERAL NOTICE

- ALL CABLES SHOULD BE INSTALLED TO IET METHOD NUMBER 31.
- GENERAL INFORMATION SHOWN ON THIS DRAWING IS SUBJECT TO CHANGE WITHOUT NOTICE AND ALL DATA SHOULD BE CONFIRMED BY E.C.P.L. ON A PROJECT SPECIFIC BASIS.
- THESE CABLE SIZES ARE BASED UPON THE MAXIMUM RUN LENGTH, SINGLE LAYER SPACED ON CABLE TRAY AT 30°C, DEVICE CONSUMPTION AND INSTALLATION CONDITIONS SHOWN ON PAGE 2. TECHNICAL ADVISE SHOULD BE SOUGHT IF THE INSTALLATION DIFFERS FROM THESE CONDITIONS

D	07/10	GENERAL UPDATES	BR	DPF	SPM
C	05/10	EFFICIENCY AMENDMENTS	BR	DPF	SPM
B	01/10	AMENDMENTS	BR	DPF	SPM
A	06/09	FIRST ISSUE	BR	DPF	SPM
REV	DATE	DESCRIPTION	UPD	CHK	APP

1. NO DIMENSIONS ARE TO BE SCALED FROM THIS DRAWING
2. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS ON SITE

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DRAWING TITLE		E 70M	
TYPICAL SCHEMATIC		TECHNICAL DATA	
SHEETS		SHEET 3 OF 3	
DRAWING NO.	11962 - E70M	REVISION	D
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DRAWN BY	BR	CHECKED	DPF
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Database Revision Date:

09/07/2010

PHD C-Series
Floor and Wall Mounted Vacuum Degassers with Top-up Capability

The PHD C-Series is a combined vacuum degassing and top-up pressurisation system. Models should be selected against the required system running pressure and include both wall mounted and floor standing versions. Options are available that include a top-up feature complete with air gap break tank to maintain the integrity of the cold water mains supply.



Noise Output	<75 dbA
Fluid Category Protection	5 Weir Overflow Air Gap

Product Name	Electrical Power Supply	Power Consumption (KW)	Full Load Current (amps)	Product Code
PHD C150	230/1/50	0.5	3.4	98333210
PHD C160	230/1/50	2 x 0.5	2 x 3.4	98333211
PHD C180	230/1/50	2 x 0.75	2 x 5.6	98333212
PHD C816	415/3/50	2 x 2.2	2 x 6.6	98333213

Product Name	Pump Quantity	Maximum Fill Pressure (bar)	Orientation	Pressure Rating (PN)	Break Tank Volume (litres)	System Operating Pressure (bar)
PHD C150	1	5.0	Wall Mounted	10	4	1 – 5
PHD C160	2	6.0	Floor Standing	10	18	1 – 6
PHD C180	2	8.0	Floor Standing	10	18	1 – 8
PHD C816	2	16.0	Floor Standing	16	18	8 - 16

Break Tank Capacity	Dimensions (mm)			Connections (mm)			Dry Weight (Kg)
	Width	Depth	Height	System	Mains Supply	Drain	
PHD C150	410	290	480	2 x 15	15	22	28
PHD C160	470	320	1160	2 x 15	15	22	60
PHD C180	600	320	1160	2 x 15	15	22	74
PHD C816	650	450	1160	2 x 15	15	22	120

Pressure conditions

System and test pressures

Pressure	System pressure		Test pressure	
	[bar]	[MPa]	[bar]	[MPa]
PN 6	6	0.6	10	1.0
PN 6 / PN 10	10	1.0	16	1.6
PN 16	16	1.6	24	2.4
PN 25	25	2.5	38	3.8

Sound pressure level

Motor [kW]	Max. sound pressure level [dB(A)] - ISO 3743	
	Three-phase motors	
	2-pole	4-pole
0.12	-	-
0.25	-	45
0.37	57	45
0.55	56	45
0.75	57	49
1.1	63	53
1.5	64	53
2.2	65	55
3.0	64	55
4.0	68	57
5.5	67	62
7.5	73	62
11.0	70	66
15.0	70	66
18.5	70	63
22.0	70	63
30.0	71	65
37.0	71	65
45.0	75	65
55.0	75	68
75.0	77	71
90.0	77	71
110.0	81	75
132.0	81	75
160.0	81	75
200.0	81	75
250.0	80	77
315.0	-	77

The audible noise from TP pumps is primarily noise from the motor fan. The selection of TPE pumps will reduce the noise at partial load, as the motor, and consequently, the motor fan runs at a lower speed. Possible flow noise from control valves is also reduced at partial load in the case of the TPE pump.

Ambient temperature

MG – EFF1-motors: 1.1-11 kW motors, 2-pole 1.1-4 kW, 4-pole	-30 to +60°C
Siemens – EFF1-motors: 15-90 kW motors, 2-pole 5.5-90 kW motors, 4-pole	-30 to +55°C
Other motor sizes:	-30 to +40°C
Storage:	Down to -30°C

If the ambient temperature exceeds above maximum values or if the motor is located more than 1000 metres above sea level, the motor output (P₂) must be reduced due to the low density and consequent low cooling effect of the air. In such cases, it may be necessary to use an oversize motor with a higher rated output.

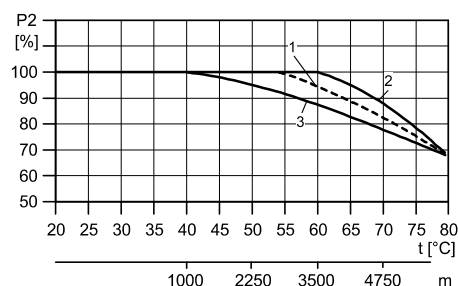


Fig. 1 Relationship between motor output (P₂) and altitude

Key

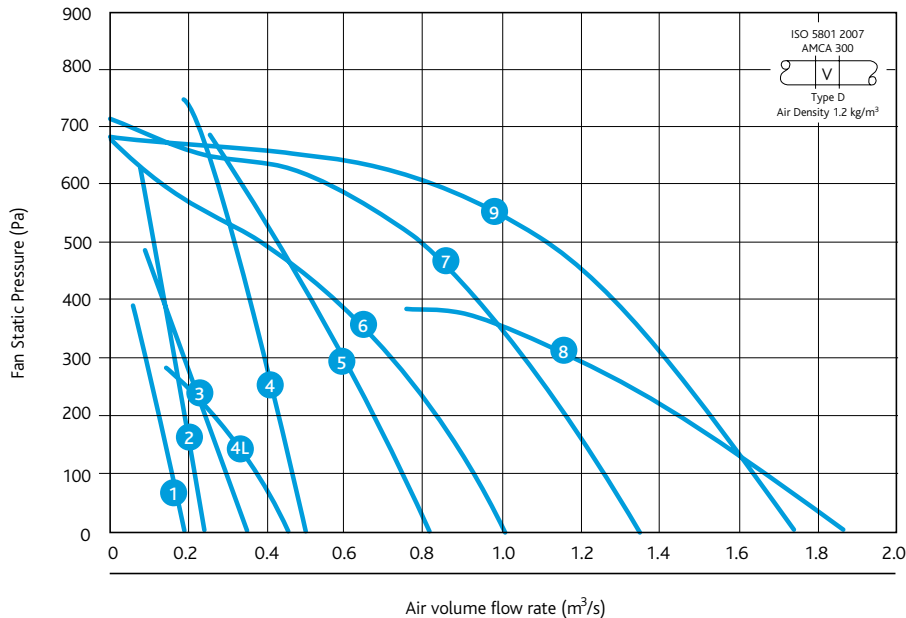
Pos	Description
1	Siemens – EFF1-motors: 15-90 kW motors, 2-pole 5.5-90 kW motors, 4-pole
2	MG – EFF1-motors: 1.1-11 kW motors, 2-pole 1.1-4 kW, 4-pole
3	Other motor sizes

TM03 2479 4405

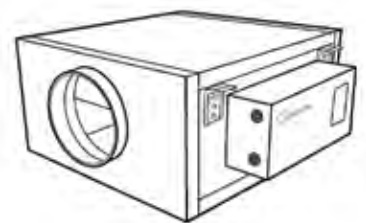
AIRE-VOLVE SINGLE EXTRACT FANS

TECHNICAL INFORMATION

PERFORMANCE - AIRE-VOLVE INTERNAL SINGLE EXTRACT FANS 1-9



Casing



AVS Internal In-line Single Fans

Code descriptions

AVS1

1 2 3

1. Aire-Volve range
2. Single Fan
3. Case size 1-9

PERFORMANCE - AIRE-VOLVE INDOOR SINGLE EXTRACT FANS 1-9

ELECTRICAL & SOUND

1. Unweighted induct inlet octave band Sound Power level - dB re 1pW
2. Unweighted induct outlet octave band Sound Power level - dB re 1pW
3. Casing radiated octave band Sound Power level - dB re 1pW

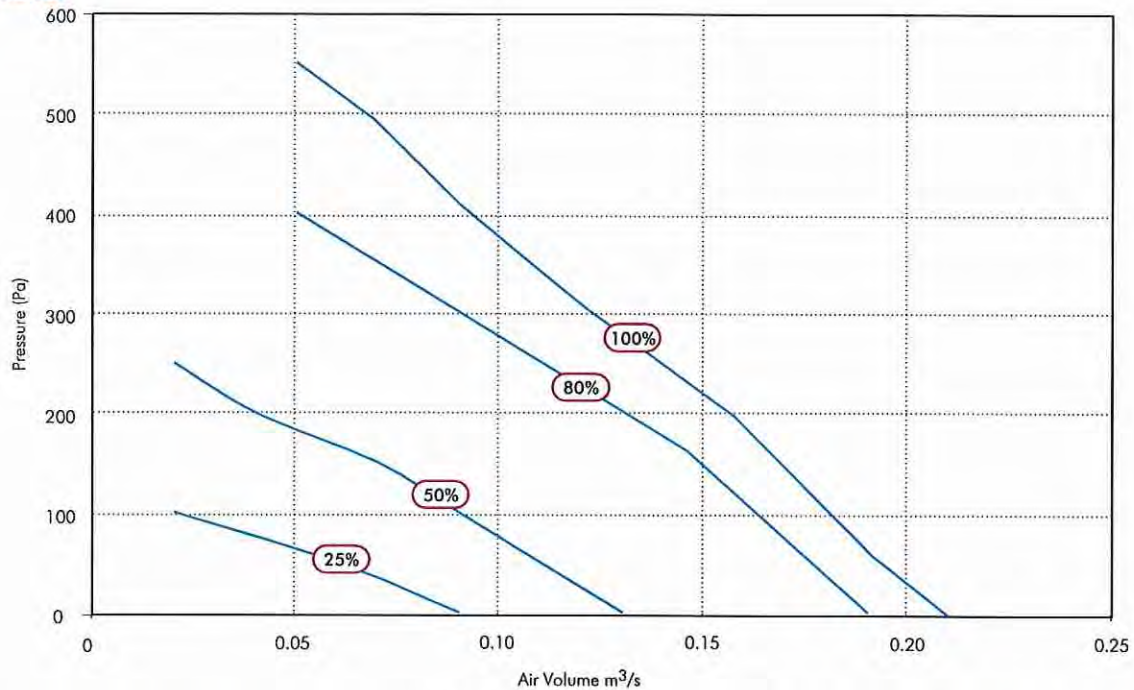
*Casing Radiated Free Field dBA @ 3m (Spherical Radiation)

Curve/ Code	Duct conn.	Supply (V/Freq Hz/Phase)	FLC (amps)	SC (amps)	Input Power (Max) (W)	Fan Speed (Nominal)	Frequency (Hz)								
							63	125	250	500	1K	2K	4K	8K	
AVS1	200	230/50/1	0.75	0.75	85	3300	1	73	69	63	63	60	56	52	50
							2	75	71	63	63	63	59	53	51
							3	61	53	43	34	25	21	23	17
AVS2	200	230/50/1	1.4	1.4	170	4000	1	79	75	69	69	66	62	58	56
							2	81	77	69	69	69	65	59	57
							3	67	59	49	40	31	27	29	23
AVS3	250	230/50/1	1.35	1.35	170	2500	1	78	74	79	67	63	59	53	51
							2	82	77	79	74	69	68	58	58
							3	68	59	59	45	31	30	28	24
AVS4	315	230/50/1	3.1	3.1	500	3400	1	84	80	81	83	78	75	71	67
							2	87	84	80	84	84	81	75	68
							3	73	66	60	55	46	43	45	34
AVS4L	315	230/50/1	1.1	1.1	160	1700	1	72	67	67	66	60	57	53	48
							2	74	69	69	70	69	62	58	52
							3	66	57	55	45	37	30	32	22
AVS5	315	230/50/1	3.5	3.5	550	2400	1	74	71	69	68	62	61	57	52
							2	76	73	71	72	71	66	62	56
							3	62	55	51	43	33	28	32	22
AVS6	400	230/50/1	2.9	2.9	450	1700	1	77	80	74	72	66	65	61	54
							2	80	82	74	73	67	66	63	56
							3	66	64	54	44	29	28	33	22
AVS7	400	230/50/1	3.5	3.5	790	1700	1	78	76	73	73	67	65	62	57
							2	81	77	74	75	74	71	67	61
							3	67	59	54	46	36	33	37	27
AVS8	500	230/50/1	3.2	3.2	710	1100	1	74	76	71	66	62	64	60	54
							2	76	78	73	71	71	69	64	57
							3	62	60	53	42	33	31	34	23
AVS9	500	400/50/3	1.85	1.85	1000	1500	1	79	77	76	75	68	66	66	58
							2	81	78	79	78	76	72	70	61
							3	67	60	59	49	38	34	40	27

*Break out fan only: These figures are available at 1m dBA, please contact Nuaire.

Sentinel Totus² D-ERV - Mini Model

Performance



Speed	Airflow, m³/s @ Pa													Fans	Supply	Frost	Unit Rated
	0	50	100	150	200	250	300	350	400	450	500	550	F.L.C.	Voltage	Heater	Current	
100%	m³/s	0.21	0.19	0.18	0.17	0.16	0.14	0.12	0.11	0.09	0.08	0.07	0.05	2.5	230V/ 1/ 50Hz	2KW	12A
	Watts	334	337	337	337	336	333	332	337	332	335	329	335				
	SFP	1.59	1.77	1.87	1.98	2.10	2.38	2.77	3.06	3.69	4.19	4.70	6.70				
80%	m³/s	0.19	0.18	0.16	0.15	0.13	0.11	0.09	0.07	0.05				1.85			
	Watts	263	262	265	268	266	263	259	254	245							
	SFP	1.38	1.46	1.66	1.79	2.05	2.39	2.88	3.63	4.90							
50%	m³/s	0.13	0.11	0.09	0.07	0.04	0.02							0.8			
	Watts	110	112	111	109	105	96										
	SFP	0.85	1.02	1.23	1.56	2.63	4.80										
25%	m³/s	0.09	0.06	0.02										0.35			
	Watts	46	46	41													
	SFP	0.51	0.77	2.05													

Performance Data from Lab Report Ref: LR5100

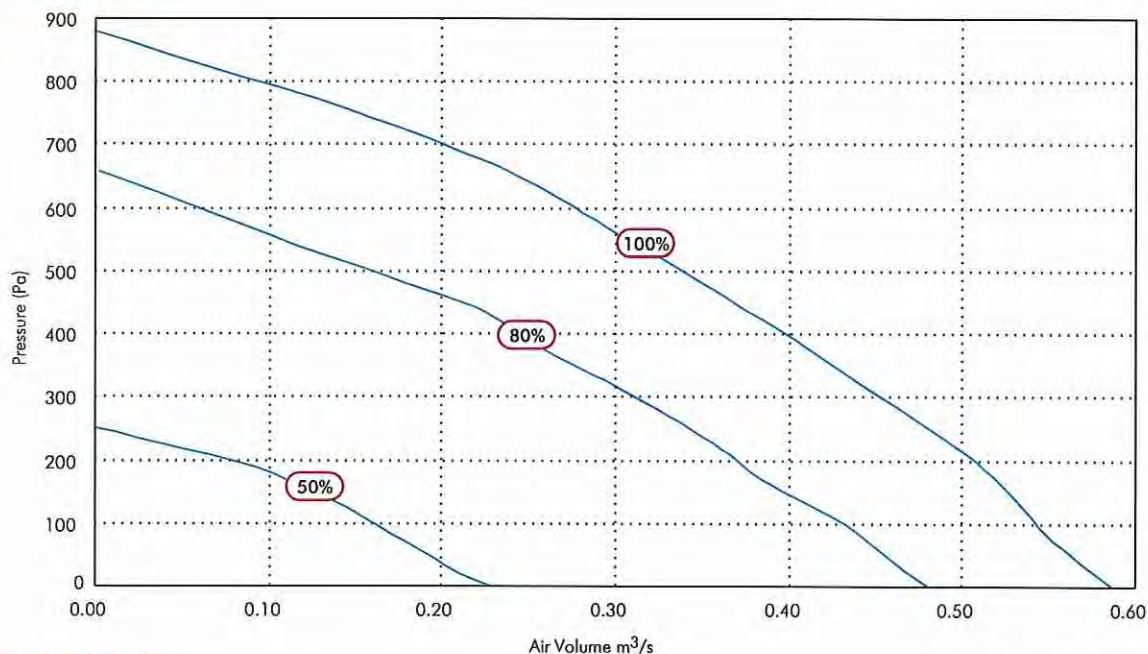
Sound Data

Octave Band Frequency SWL

Speed	Test Mode	63	125	250	500	1K	2K	4K	8K	dBA @ 3m
100%	Intake	58	65	69	54	53	54	48	46	33
	Supply	55	59	55	50	49	53	37	36	
	Discharge	59	68	74	66	63	67	55	57	
	Exhaust	55	60	63	52	50	55	37	36	
	Breakout	55	53	55	47	43	46	33	31	
	Intake	58	65	69	54	53	54	48	46	
80%	Supply	53	58	55	46	48	50	34	33	31
	Discharge	59	67	74	64	62	65	53	55	
	Exhaust	55	59	60	50	48	52	34	34	
	Breakout	53	52	53	44	42	44	31	30	
	Intake	54	58	64	49	47	42	35	36	
	Supply	49	53	53	39	40	38	26	29	
50%	Discharge	54	62	69	56	55	53	43	43	25
	Exhaust	50	54	56	41	41	39	25	29	
	Breakout	50	48	49	38	35	33	24	27	
	Intake	47	52	48	39	37	30	26	29	
	Supply	48	48	38	33	31	27	22	28	
	Discharge	49	59	51	48	44	41	30	30	
25%	Exhaust	48	50	39	34	31	28	23	29	17
	Breakout	44	45	33	32	28	25	23	26	
	Intake	47	52	48	39	37	30	26	29	

Sentinel Totus² D-ERV - Maxi Model

Performance Curve



Performance Guide

Speed	Airflow, m³/s @ Pa														Fans	Supply	Frost	Unit		
	0	50	100	150	200	250	300	350	400	450	500	550	600	F.L.C.	Voltage	Heater	Current			
100%	m³/s	0.587	0.58	0.54	0.52	0.51	0.48	0.43	0.415	0.4	0.365	0.34	0.31	0.268	5	230V/ 1/ 50Hz	4KW	20A		
	SFP	1.73	1.75	1.88	1.95	1.99	2.11	2.36	2.44	2.53	2.78	2.98	3.27	3.78						
80%	m³/s	0.48	0.46	0.43	0.4	0.38	0.345	0.315	0.28	0.24	0.22	0.16		3						
	SFP	1.31	1.37	1.46	1.57	1.66	1.82	3	2.25	2.62	2.86	3.93								
50%	m³/s	0.228	0.19	0.16	0.125	0.07								1						
	SFP	0.82	0.99	1.17	1.5	2.67														

Sound Data

Speed	Test Mode	Octave Band Frequency SWL								dB(A) @3m
		63	125	250	500	1k	2k	4k	8k	
100%	Intake	67	72	75	72	73	71	68	62	41
	Supply	62	65	75	66	65	61	53	46	
	Discharge	67	70	83	72	75	73	70	65	
	Extract	62	64	74	63	60	54	44	39	
	Breakout	66	67	70	53	48	49	41	39	
80%	Intake	64	71	77	70	69	60	65	56	40
	Supply	60	64	77	63	62	57	49	43	
	Discharge	65	69	82	69	72	70	67	59	
	Extract	59	63	75	60	57	51	42	38	
	Breakout	64	63	68	50	53	44	38	36	
50%	Intake	56	68	57	57	57	53	49	40	30
	Supply	52	66	57	51	50	44	35	31	
	Discharge	56	64	61	56	59	57	50	41	
	Extract	52	62	52	46	43	37	28	28	
	Breakout	54	62	52	41	39	38	34	32	
25%	Intake	48	47	40	37	35	29	23	29	20
	Supply	46	43	39	33	31	25	23	29	
	Discharge	46	45	42	40	41	34	25	29	
	Extract	48	41	37	31	26	23	23	29	
	Breakout	46	44	40	32	30	28	26	30	

The Single Models

SENT100S & SENT100S/CP

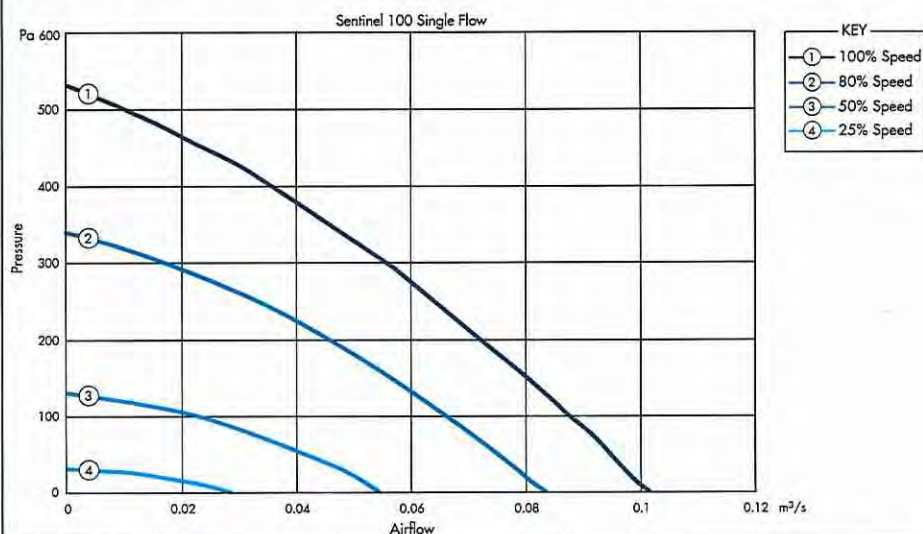


Performance Guide

Speed	Phase	Performance	Airflow, m ³ /s @ Pa													Amps FLC	
			0	25	50	100	125	150	200	250	300	350	375	400	450		500
100%	1	Airflow	0.101	0.097	0.094	0.087	0.084	0.08	0.072	0.064	0.056	0.046	0.041	0.036	0.024	0.011	0.72
		SFP	0.84	0.88	0.90	0.98	1.01	1.06	1.18	1.33	1.52	1.85	2.07	-	-	-	
80%	1	Airflow	0.083	0.079	0.075	0.066	0.061	0.056	0.046	0.033	0.018						0.50
		SFP	0.46	0.48	0.51	0.58	0.62	0.68	0.83	1.15	2.11						
50%	1	Airflow	0.054	0.048	0.041	0.023	0.008										0.15
		SFP	0.33	0.38	0.44	0.78	2.75										
25%	1	Airflow	0.028	0.013													0.08
		SFP	0.21	0.46													

Sound Data

Speed	Test Mode	Octave Band Frequency SWL								dB(A) @3m
		63	125	250	500	1k	2k	4k	8k	
100%	Inlet	57.2	68.7	68	70.1	59.4	53.1	47.3	41.8	42.5
	Outlet	54.9	67.7	70	70.5	68.1	64.6	57.7	49.5	49.3
	Breakout	58.7	63.8	63.3	63	54.8	51.2	46.4	42.1	42.2
80%	Inlet	52.2	63.7	63	65.1	54.3	48.1	42.3	36.8	37.5
	Outlet	50.1	62.9	65.1	65.6	63.2	59.7	52.9	44.6	44.5
	Breakout	53.8	58.9	58.5	58.2	49.9	46.4	41.5	37.2	37.3
50%	Inlet	42.2	53.7	52.9	55.1	44.3	38.1	32.3	26.8	27.5
	Outlet	39.9	52.7	54.9	55.4	53	49.5	42.7	34.4	34.3
	Breakout	43.6	48.7	48.3	48	39.7	36.2	31.4	27	27.1
25%	Inlet	27.1	38.6	37.9	40	29.2	23	17.2	11.7	12.4
	Outlet	24.8	37.6	39.9	40.4	37.9	34.5	27.6	19.4	19.2
	Breakout	28.6	33.7	33.2	32.9	24.7	21.1	16.3	11.9	12.1



SENT125S & SENT125S/CP

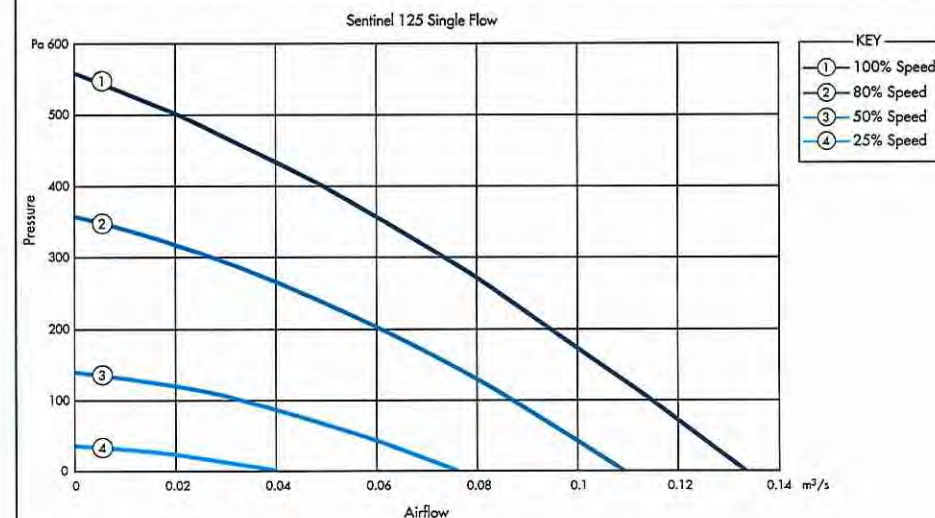


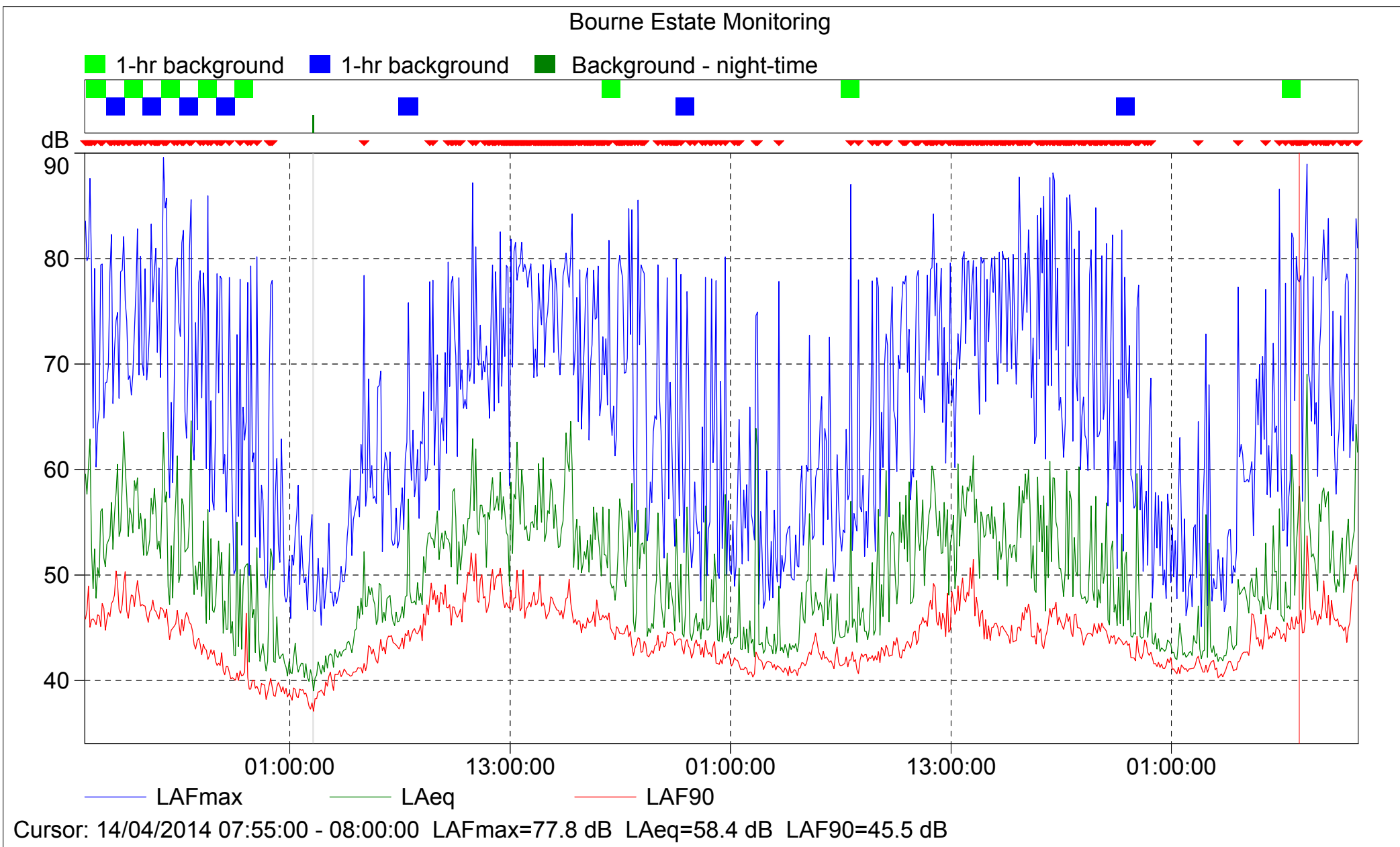
Performance Guide

Speed	Phase	Performance	Airflow, m³/s @ Pa													Amps FLC	
			0	25	50	100	125	150	200	250	300	350	400	450	500		550
100%	1	Airflow	0.133	0.129	0.124	0.115	0.11	0.105	0.095	0.084	0.073	0.068	0.061	0.049	0.035	0.02	0.72
		SFP	0.64	0.66	0.69	0.74	0.77	0.81	0.89	1.01	1.16	1.25	1.39	1.73	2.43	-	
80%	1	Airflow	0.109	0.104	0.099	0.087	0.081	0.075	0.061	0.045	0.027	0.016	0.003				0.51
		SFP	0.35	0.37	0.38	0.44	0.47	0.51	0.62	0.84	1.41	2.38	-				
50%	1	Airflow	0.075	0.066	0.057	0.033	0.015										0.18
		SFP	0.29	0.33	0.39	0.67	1.47										
25%	1	Airflow	0.04	0.019													0.09
		SFP	0.35	0.74													

Sound Data

Speed	Test Mode	Octave Band Frequency SWL								dB(A) @3m
		63	125	250	500	1k	2k	4k	8k	
100%	Inlet	57.9	68.5	68.3	70.5	62.4	57.3	50.8	45.5	44.5
	Outlet	58.7	68.4	69.6	74.2	69.7	67.2	61.9	53.7	51.9
	Breakout	56.3	59.2	63.4	62.8	56.5	52.1	45.2	38.2	42.3
80%	Inlet	53.1	63.6	63.4	65.7	57.4	52.4	46	40.4	39.7
	Outlet	53.9	63.6	64.7	69.4	64.9	62.4	57.1	48.8	47.1
	Breakout	51.5	54.3	58.6	58	51.6	47.3	40.4	33.3	37.5
50%	Inlet	42.9	53.4	53.3	55.5	47.4	42.2	35.8	30.4	29.5
	Outlet	43.7	53.4	54.5	59.2	54.7	52.2	46.9	38.6	36.9
	Breakout	41.3	44.1	48.4	47.8	41.4	37.1	30.2	23.1	27.3
25%	Inlet	27.8	38.3	38.2	40.4	32.3	27.2	20.8	15.4	14.4
	Outlet	28.6	38.3	39.4	44.1	39.6	37.1	31.8	23.6	21.8
	Breakout	26.2	29.1	33.3	32.7	26.4	22	15.1	8.1	12.2

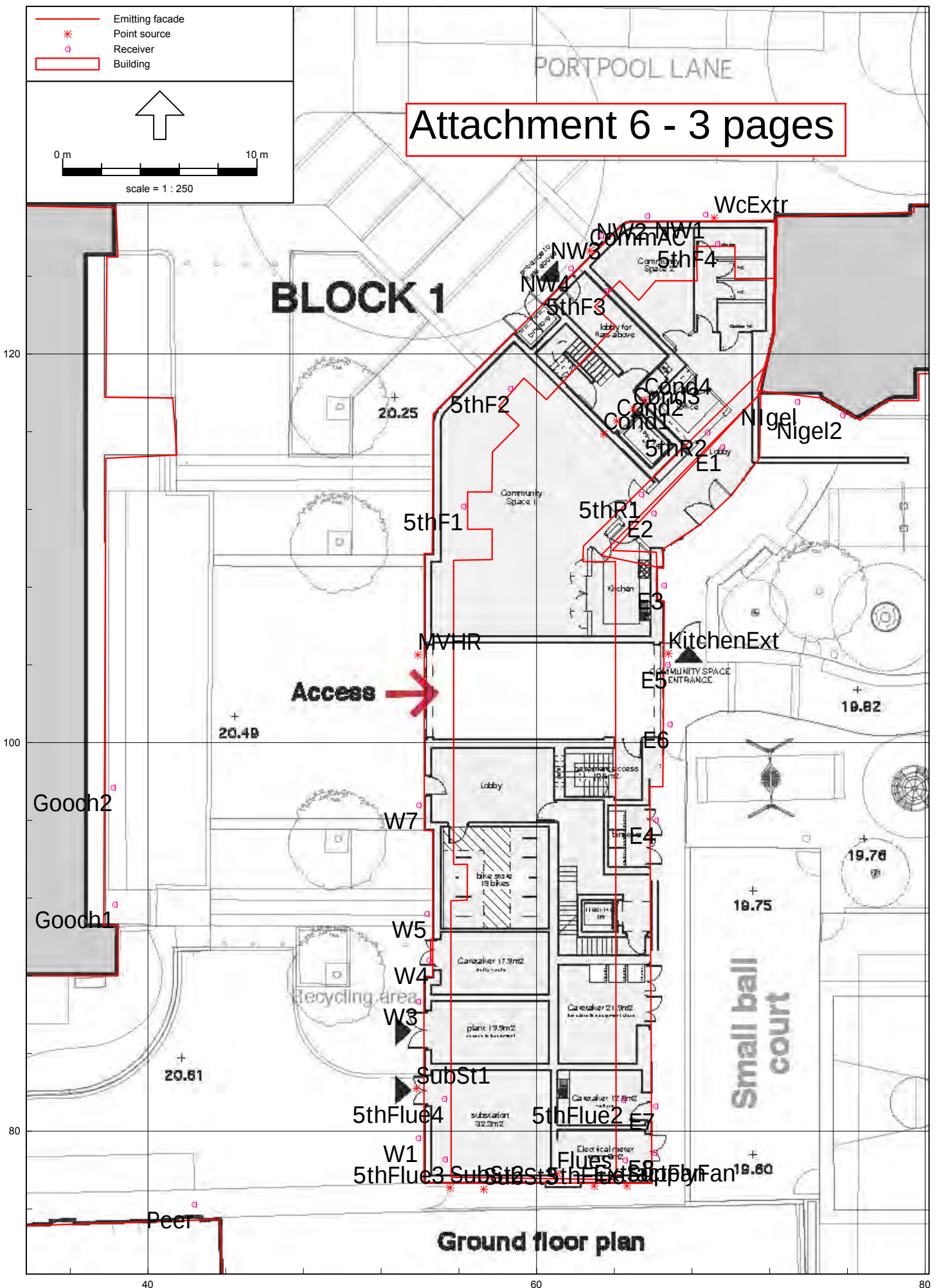


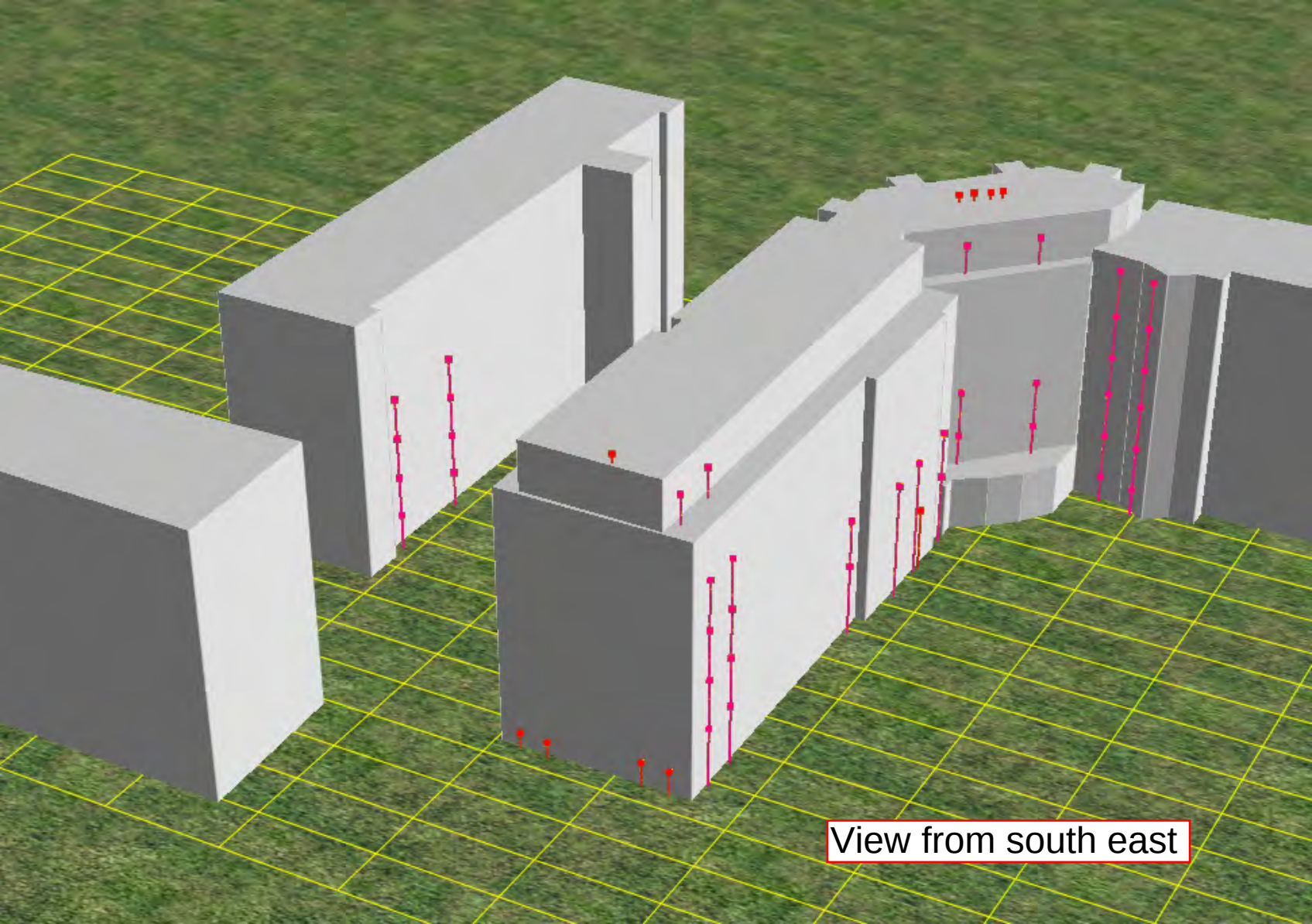


Attachment 5 - 2 pages

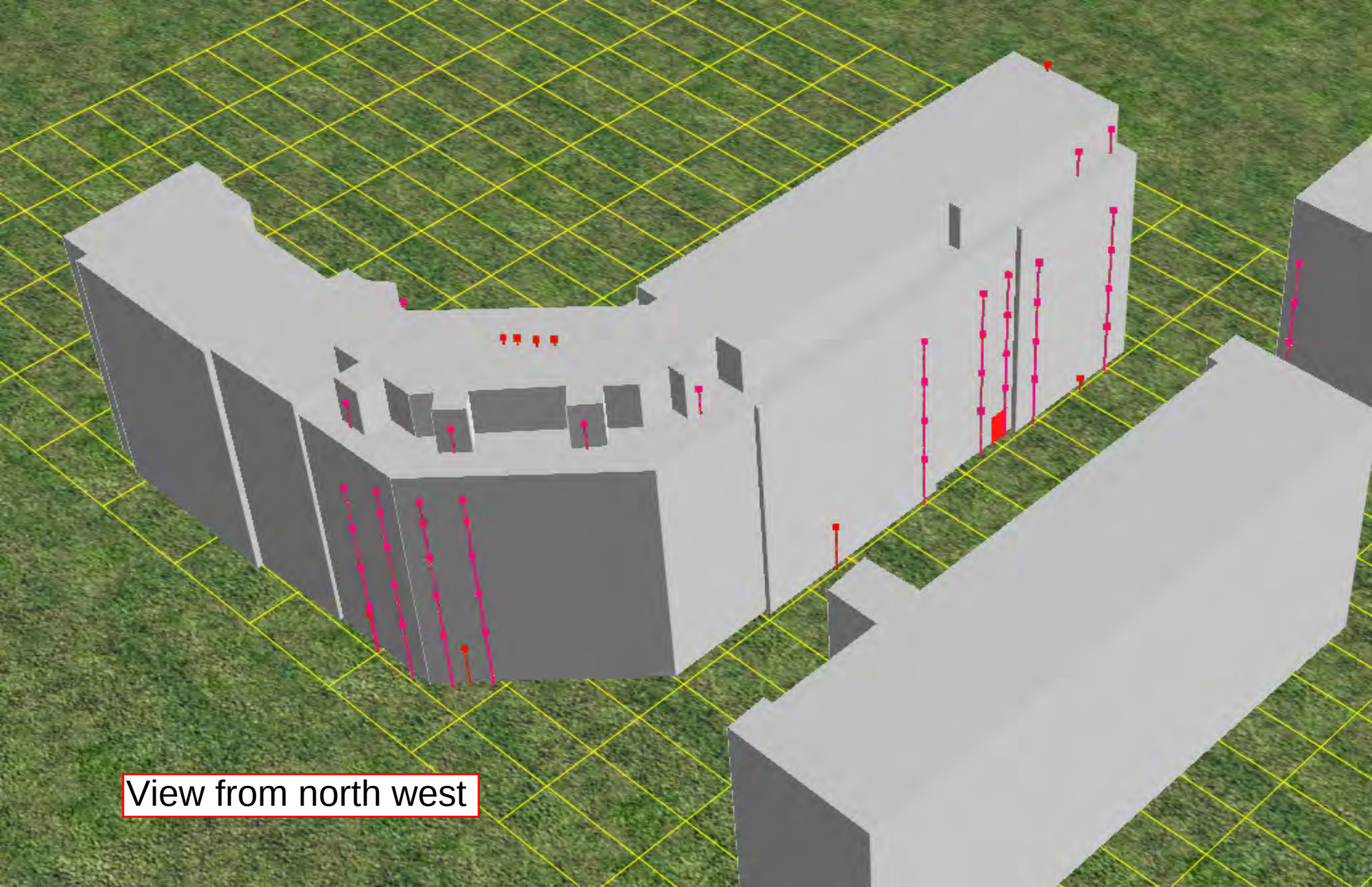
Bourne Estate monitoring

Name	Start time	LAFmax [dB]	LAF10 [dB]	LAeq [dB]	LAF90 [dB]
Total	11/04/2014 13:50:30	89.6	54.4	53.7	41.8
Unmarked	11/04/2014 13:50:30	89.0	54.5	53.5	41.6
(All) 1-hr background	11/04/2014 13:55:00	89.6	54.3	54.5	42.5
(All) 1-hr background	11/04/2014 15:00:00	85.6	54.0	53.7	43.0
(All) Background - night-time	12/04/2014 02:15:00	46.7	41.2	39.0	37.1
1-hr background	11/04/2014 13:55:00	87.6	55.2	56.2	45.8
1-hr background	11/04/2014 16:00:00	82.8	59.8	57.1	47.4
1-hr background	11/04/2014 18:00:00	89.6	56.0	57.3	45.3
1-hr background	11/04/2014 20:00:00	86.0	50.4	51.2	42.6
1-hr background	11/04/2014 22:00:00	79.3	49.8	49.7	40.1
1-hr background	12/04/2014 18:00:00	81.7	53.5	52.9	45.0
1-hr background	13/04/2014 07:00:00	87.0	47.0	48.7	41.5
1-hr background	14/04/2014 07:00:00	82.4	52.3	54.9	44.7
1-hr background	11/04/2014 15:00:00	82.3	59.7	57.6	46.9
1-hr background	11/04/2014 17:00:00	83.3	56.1	54.7	46.5
1-hr background	11/04/2014 19:00:00	85.6	55.5	56.4	44.5
1-hr background	11/04/2014 21:00:00	78.6	48.5	49.2	40.9
1-hr background	12/04/2014 06:55:00	75.8	49.9	49.6	43.9
1-hr background	12/04/2014 22:00:00	80.0	47.7	50.4	43.0
1-hr background	13/04/2014 22:00:00	82.7	47.4	48.8	42.9
Background - night-time	12/04/2014 02:15:00	46.7	41.2	39.0	37.1





View from south east



View from north west

Report: Table of Results
 Model: Plant Noise Rev.1
 LAeq per octave: total results for receivers
 Group: (main group)
 Group Reduction: No

Attachment 7 - 2 pages

Name		Day									
Receiver	Description	Height	Total	63	125	250	500	1000	2000	4000	8000
E8_A		3.70	34.4	24.7	33.0	24.9	18.2	14.4	10.1	14.0	8.8
NW1_A		3.70	34.0	4.7	25.7	29.7	29.7	15.7	15.7	21.7	17.6
E5_A		7.50	33.7	3.6	19.0	22.6	28.0	27.0	22.0	28.0	22.7
E3_A		4.50	33.6	0.9	18.4	22.0	28.0	26.9	21.9	27.9	22.6
W4_A		4.00	32.6	23.6	27.8	27.7	22.7	18.7	18.6	16.2	13.6
W5_A		3.70	32.1	22.7	26.9	27.8	22.0	18.0	17.8	16.1	14.1
E8_B		6.75	31.7	21.6	30.2	22.4	16.5	13.0	8.7	12.9	6.9
W7_A		3.70	31.2	15.4	21.6	29.7	18.5	13.4	12.6	17.5	15.9
5thR2_A		1.80	31.0	3.5	19.4	24.2	24.9	25.3	21.5	19.3	14.3
Peer_A		3.70	31.0	18.4	28.2	24.3	17.9	15.2	14.1	19.7	16.4
E3_B		7.50	30.8	0.8	16.0	19.5	25.2	24.1	19.3	25.0	19.6
Peer_B		6.75	30.8	18.2	28.0	24.2	17.8	15.1	13.9	19.5	16.1
E6_A		7.50	30.7	4.6	17.1	19.1	24.9	23.9	19.0	24.9	19.5
Peer_C		9.80	30.5	17.8	27.6	24.0	18.0	15.4	13.7	19.1	15.7
W7_B		6.75	30.5	14.2	20.6	29.0	17.9	13.2	11.9	16.8	15.2
5thR1_A		1.80	30.3	0.5	19.3	23.9	24.4	24.6	20.7	16.8	12.6
Peer_D		12.85	30.2	17.3	27.2	23.8	18.5	16.3	14.1	18.6	15.1
5thFlue_A		1.80	29.8	16.0	24.5	23.6	22.4	20.4	18.8	16.6	9.6
E8_C		9.80	29.5	19.1	27.9	20.5	15.5	12.3	7.6	12.0	3.2
E7_A		3.70	29.4	20.0	27.8	19.5	14.6	12.0	6.8	12.3	6.7
W7_C		9.80	29.1	12.5	19.3	27.6	16.8	13.4	12.2	15.3	13.3
W5_B		6.75	28.8	17.6	22.3	25.9	18.0	14.1	13.1	13.8	11.4
W3_A		3.70	28.6	18.9	23.5	24.8	17.8	13.7	12.5	12.0	9.3
W4_B		6.75	28.6	18.1	22.7	25.1	18.0	14.3	13.3	13.3	10.7
Nigel2_F		15.80	28.4	0.8	15.8	20.3	22.6	23.0	19.3	18.1	10.4
E8_D		12.85	28.2	17.3	26.2	19.6	16.0	14.6	11.2	12.2	2.9
E7_B		6.75	28.0	18.4	26.4	18.3	14.0	11.7	5.4	11.9	4.5
5thFlue2_A		1.80	27.9	14.2	22.0	20.3	19.7	19.7	18.7	17.2	10.6
W7_D		12.85	27.8	11.1	18.0	26.0	16.1	14.5	13.1	14.0	11.5
Nigel1_F		15.80	27.6	0.5	15.9	19.9	21.9	21.8	17.7	17.9	11.2
W5_C		9.80	27.3	14.4	19.7	24.9	16.0	13.0	11.9	12.5	10.3
5thF2_A		1.80	27.0	--	15.8	20.9	20.9	21.1	17.2	14.1	9.5
W4_C		9.80	26.8	14.7	19.9	24.0	15.7	12.9	11.5	11.9	9.5
E7_C		9.80	26.8	16.7	25.0	17.4	14.0	11.7	5.2	11.2	4.3
5thF3_A		1.80	26.6	--	15.4	20.4	20.5	20.8	16.8	13.3	8.8
W3_B		6.75	26.5	15.0	20.4	23.6	15.0	11.9	9.2	10.9	7.7
E1_A		2.00	26.4	0.9	13.0	15.5	20.8	19.6	14.5	20.3	14.6
W5_D		12.85	26.3	12.2	18.1	24.0	15.2	13.8	12.3	11.5	8.8
Gooch2_B		4.90	26.2	8.6	16.6	24.9	13.3	7.1	6.6	12.3	10.2
Gooch2_A		2.30	26.2	8.7	16.6	24.9	12.8	6.1	6.6	12.3	10.2
Gooch2_C		7.60	26.2	8.4	16.5	24.7	14.0	9.8	6.3	12.1	9.9
E7_D		12.85	26.1	15.5	23.8	17.1	15.0	14.0	10.7	11.5	3.8
W1_A		3.70	26.1	15.5	23.0	21.5	11.2	8.3	1.6	8.2	4.7
E1_B		5.00	26.0	0.9	13.4	15.6	20.4	19.3	14.5	19.7	14.0
NW3_A		4.30	26.0	0.4	18.6	24.6	11.5	9.7	8.1	2.4	4.3
Gooch2_D		10.20	26.0	8.0	16.3	24.4	14.5	11.2	7.9	11.7	9.5
W4_D		12.85	25.8	12.4	18.2	23.2	15.0	13.7	12.2	11.0	8.0
Nigel2_E		12.80	25.8	0.8	14.4	17.1	20.1	19.5	15.1	18.0	11.3
Nigel1_E		12.80	25.8	0.6	14.5	16.8	20.0	19.2	15.1	18.4	11.8
W3_C		9.80	25.5	12.9	18.9	23.0	13.9	11.6	9.6	10.3	7.3

All shown dB values are A-weighted

Report: Table of Results
 Model: Plant Noise Rev.1
 LAeq per octave: total results for receivers
 Group: (main group)
 Group Reduction: No

Name		Day									
Receiver	Description	Height	Total	63	125	250	500	1000	2000	4000	8000
NW4_A		4.30	25.4	--	17.8	24.1	10.9	9.8	8.0	1.5	3.4
Gooch1_B		4.90	25.3	10.0	17.4	23.6	12.5	5.9	6.2	10.8	8.5
Gooch1_A		2.30	25.3	10.1	17.4	23.6	12.2	6.0	6.3	10.8	8.6
NIgel1_D		10.00	25.3	0.6	13.6	15.4	19.6	18.6	14.1	18.7	12.5
W1_B		6.75	25.3	14.2	22.1	21.0	10.1	7.4	--	7.4	4.6
Gooch1_C		7.60	25.3	9.7	17.3	23.5	13.0	8.5	6.0	10.7	8.4
NIgel1_B		4.60	25.3	1.0	12.8	14.4	19.6	18.5	13.5	19.2	13.3
Gooch1_D		10.20	25.2	9.3	17.1	23.4	13.9	10.8	5.6	10.4	8.0
NIgel1_C		7.50	25.2	1.1	12.9	14.8	19.7	18.4	13.2	19.0	13.0
Nigel2_D		10.00	25.2	0.9	13.7	15.6	19.5	18.6	14.2	18.4	12.0
W1_C		9.80	25.1	13.9	21.5	21.0	11.8	8.7	0.2	7.2	4.4
Nigel2_C		7.50	25.1	0.9	12.6	14.9	19.4	18.5	14.1	18.5	12.4
5thF1_A		1.80	25.1	--	14.7	20.1	18.7	18.6	14.6	10.8	0.9
Nigel2_B		4.60	25.0	0.9	12.3	14.0	19.3	18.4	14.0	18.6	12.6
W3_D		12.85	25.0	10.8	17.7	22.4	13.9	13.0	11.2	9.2	6.8
W1_D		12.85	25.0	13.3	20.8	20.9	13.1	11.3	8.8	6.9	4.1
5thFlue3_A		1.80	24.9	11.6	20.0	20.3	17.6	13.4	6.5	0.1	--
NW1_B		6.75	24.7	--	16.5	20.5	20.3	6.3	6.3	12.2	7.9
NIgel1_A		1.70	23.8	0.8	11.8	12.3	18.2	17.1	12.0	17.7	11.8
Nigel2_A		1.70	23.5	0.9	11.9	12.2	17.9	16.8	11.6	17.4	11.4
5thFlue4_A		1.80	22.6	9.1	17.3	18.3	15.4	12.0	4.3	0.4	--
E2_A		2.00	22.6	--	9.4	12.6	17.2	15.7	10.5	16.2	10.2
NW2_A		4.30	22.4	--	13.8	18.6	17.1	10.4	8.3	8.4	4.1
E2_B		5.00	22.4	--	10.3	12.9	16.5	15.9	12.4	15.4	9.0
5thF4_A		1.80	22.1	--	11.0	15.8	16.1	16.3	12.8	9.7	0.1
NW4_D		12.85	21.9	--	11.2	17.3	14.3	15.2	13.3	9.4	--
NW4_E		14.40	21.7	--	12.9	18.2	14.8	13.6	9.0	--	--
NW2_B		7.40	21.4	--	11.9	17.0	16.3	11.8	9.7	7.0	2.5
E4_A		4.50	21.1	6.7	15.5	10.7	14.8	13.1	7.8	12.3	4.8
NW2_D		12.85	21.1	--	9.9	15.2	14.9	14.1	12.7	9.9	--
NW2_C		10.30	21.0	--	10.3	15.8	15.5	13.1	11.2	8.9	0.5
NW4_C		10.30	21.0	--	10.8	17.3	12.9	13.5	11.5	6.9	--
NW1_C		9.80	21.0	--	12.4	17.0	16.5	4.4	2.3	8.2	3.7
NW4_B		7.40	20.8	--	11.0	18.6	11.3	11.6	9.2	--	--
NW3_D		12.85	20.7	--	9.4	14.7	13.5	14.6	13.0	9.1	--
E4_B		7.50	20.1	7.4	15.3	9.9	13.6	11.5	6.1	10.4	2.5
NW3_B		7.40	20.1	--	10.9	17.2	11.5	11.5	9.1	--	--
NW3_C		10.30	19.9	--	8.5	15.2	12.7	13.3	11.3	6.7	--
NW2_E		14.40	19.8	--	10.7	15.7	14.5	10.8	5.7	2.7	--
NW3_E		14.40	19.3	--	10.8	15.3	13.0	11.3	7.4	--	--
NW1_D		12.85	19.3	--	9.1	15.4	14.9	7.2	0.3	5.5	0.8

All shown dB values are A-weighted