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Environmental Noise Impact Assessment.

Address:
4 Lamp Office Court,
Lambs Conduit Street, London WC1N 3NFl

Client:

Manan Upadhyay Architect Ben Pentreath & Associates

19 October 2018

Acoustic Consultant: Simone Longo AMIOA

Acoustic Report – Environmental Noise EA. 3 Lamp Office Court, Lambs Conduit Street London WC1N 3NF Engineer: Simone Longo AMIOA	N. M. & S. www.noisemeasurements.co.uk - www.nmsacoustics.com e: info@nmsacoustics.com t: 0800 014 8482 - m: 07887561945 (24 hours)

Summary:

Acoustic Report – Environmental Noise EA. 3 Lamp Office Court, Lambs Conduit Street London WC1N 3NF Engineer: Simone Longo AMIOA	N. M. & S. www.noisemeasurements.co.uk - www.nmsacoustics.com e: info@nmsacoustics.com t: 0800 014 8482 - m: 07887561945 (24 hours)

1.0 Survey address.

1.1 At the rear of 55-56 Lambs Conduit Street London WC1N 3NF, the measuring microphone was positioned in correspondence of the nearest noise sensitive window at 1 m from the building façade.

1.2 Fig below shows the relevant details at the installation site.

1.2.1 In "A" is the microphone position used for the noise survey.

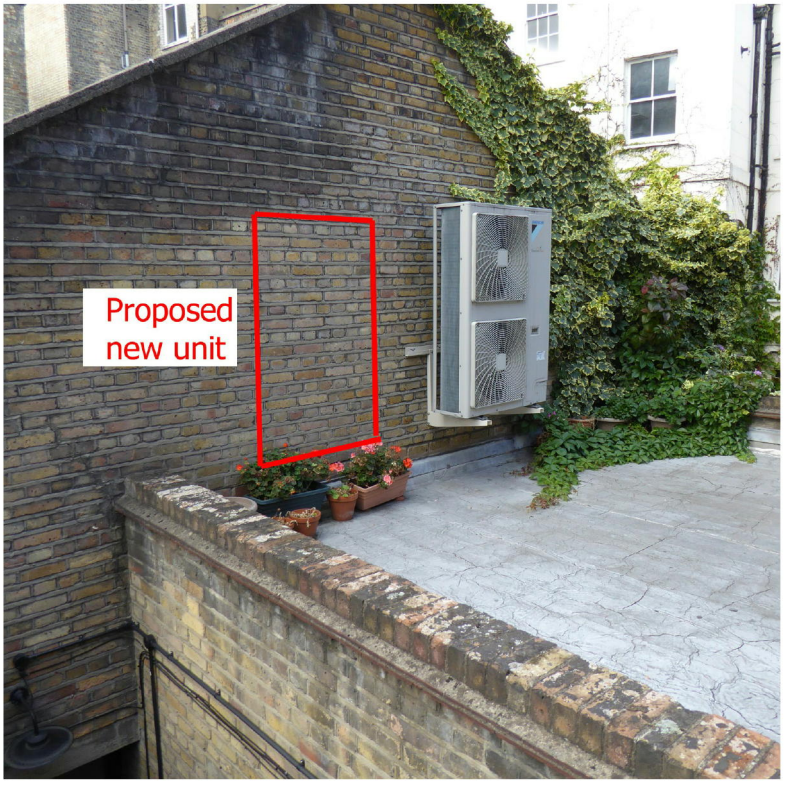
1.2.2 In "B" is the proposed installation site of the unit.

1.2.3 "A", "C" and "D" indicates the nearest façade affected by the noise emission.

1.2.3.1 Façade in "D" is in the acoustic shadow (yellow area) caused by the rear wall at the back of the unit (see picture below showing the installation site).

1.2.3.2 The shortest path for the noise to travel to the sensitive location is in front of the unit affecting façade "A", noise emission in this direction should be estimate taking into account a correction for the rear wall reflection from the back of the unit projecting in direction of "A".

1.3 The rear wall at the proposed installation site for the unit, the wall cause an acoustic shadow towards the rear properties but a correction should be added for the forward facing façade in "A"



2.0 Environmental noise survey details.

2.1 Operating hours:

2.2 The proposed operating hours for the unit is from 8 am to 18.00 Monday to Saturday.

2.3 In order to estimate the lowest representative background noise LA90,15 min at the sensitive location a precision sound level meter (SLM) was used to monitor the ambient noise during operating hours of the proposed unit, the survey took place on the 13/03/2015.

2.4 Another sample based survey was carried out on the 5th of September 2018 to cover the period of lowest background noise with an update information about the environmental noise in the area.

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3.0 Environmental noise survey results.

3.1 Lowest representative environmental background noise recorded within the period of interest is given in table below.

Lowest LA90,*15min.*		
13/03/15	Time @ 17.48	46.4 dB LA90,15min
05/10/18	Time @ 16.01	50.7 dB LA90,15min

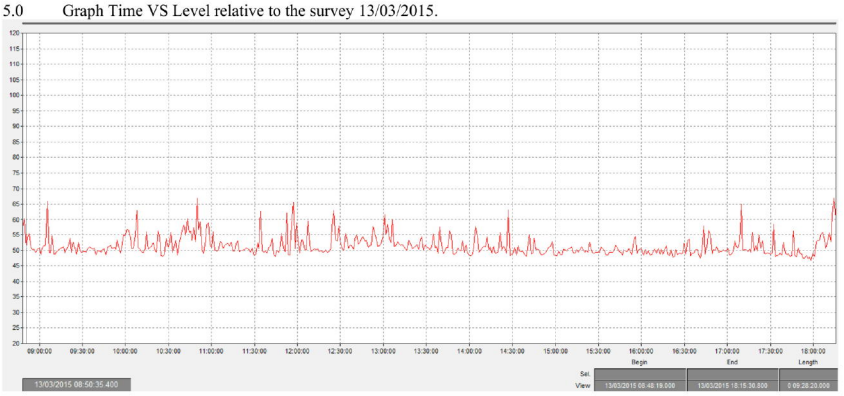
4.0 Subjective analysis of the environmental noise or soundscape at the site.

4.1 On the 13 of March 2015, the specific location at the rear of the building was relatively quiet for a city centre, primarily dominated by slow traffic noise.

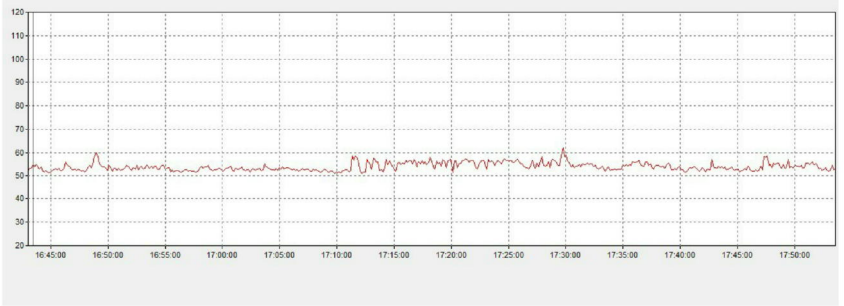
4.2 During the more recent survey on the 5th of September 2018 the ambient noise in the area changed due to the presence of an hair dresser business, the hairdresser rear door is open therefore noise emission from voices hair dryer and music affect the nearby area which includes the noise sensitive facade.

4.3 The location remain a quiet place considering the central position but the early soundscape now is changed to include human activity and music noise.

5.0 Graph Time VS Level relative to the survey 13/03/2015.



6.0 Graph Time VS Level relative to the survey 05/10/2018.



7.0 Weather condition:

7.1 No particular remarks, wind or atmospheric precipitations.

8.0 Survey numerical data.

Calculation interval (absolute time) 13/03/2015 08:48:19.000 - 13/03/2015 18:16:34.550	Effective duration	L 90.0%: LAF(spl) (dB)
13/03/2015 08:48:19.000 - 13/03/2015 09:03:18.999	0 00:15:00.000	48.2 dB
13/03/2015 09:03:19.000 - 13/03/2015 09:18:18.999	0 00:15:00.000	48.4 dB
13/03/2015 09:18:19.000 - 13/03/2015 09:33:18.999	0 00:15:00.000	48.3 dB
13/03/2015 09:33:19.000 - 13/03/2015 09:48:18.999	0 00:15:00.000	48.3 dB
13/03/2015 09:48:19.000 - 13/03/2015 10:03:18.999	0 00:15:00.000	48.7 dB
13/03/2015 10:03:19.000 - 13/03/2015 10:18:18.999	0 00:15:00.000	48.5 dB
13/03/2015 10:18:19.000 - 13/03/2015 10:33:18.999	0 00:15:00.000	47.9 dB
13/03/2015 10:33:19.000 - 13/03/2015 10:48:18.999	0 00:15:00.000	48.7 dB
13/03/2015 10:48:19.000 - 13/03/2015 11:03:18.999	0 00:15:00.000	48.9 dB
13/03/2015 11:03:19.000 - 13/03/2015 11:18:18.999	0 00:15:00.000	48.6 dB
13/03/2015 11:18:19.000 - 13/03/2015 11:33:18.999	0 00:15:00.000	48.0 dB
13/03/2015 11:33:19.000 - 13/03/2015 11:48:18.999	0 00:15:00.000	48.0 dB
13/03/2015 11:48:19.000 - 13/03/2015 12:03:18.999	0 00:15:00.000	48.1 dB
13/03/2015 12:03:19.000 - 13/03/2015 12:18:18.999	0 00:15:00.000	48.8 dB
13/03/2015 12:18:19.000 - 13/03/2015 12:33:18.999	0 00:15:00.000	48.8 dB
13/03/2015 12:33:19.000 - 13/03/2015 12:48:18.999	0 00:15:00.000	49.5 dB
13/03/2015 12:48:19.000 - 13/03/2015 13:03:18.999	0 00:15:00.000	50.2 dB
13/03/2015 13:03:19.000 - 13/03/2015 13:18:18.999	0 00:15:00.000	49.3 dB
13/03/2015 13:18:19.000 - 13/03/2015 13:33:18.999	0 00:15:00.000	49.1 dB
13/03/2015 13:33:19.000 - 13/03/2015 13:48:18.999	0 00:15:00.000	48.5 dB
13/03/2015 13:48:19.000 - 13/03/2015 14:03:18.999	0 00:15:00.000	47.9 dB
13/03/2015 14:03:19.000 - 13/03/2015 14:18:18.999	0 00:15:00.000	48.3 dB
13/03/2015 14:18:19.000 - 13/03/2015 14:33:18.999	0 00:15:00.000	47.6 dB
13/03/2015 14:33:19.000 - 13/03/2015 14:48:18.999	0 00:15:00.000	47.6 dB
13/03/2015 14:48:19.000 - 13/03/2015 15:03:18.999	0 00:15:00.000	47.5 dB
13/03/2015 15:03:19.000 - 13/03/2015 15:18:18.999	0 00:15:00.000	48.2 dB
13/03/2015 15:18:19.000 - 13/03/2015 15:33:18.999	0 00:15:00.000	48.2 dB
13/03/2015 15:33:19.000 - 13/03/2015 15:48:18.999	0 00:15:00.000	47.9 dB
13/03/2015 15:48:19.000 - 13/03/2015 16:03:18.999	0 00:15:00.000	48.0 dB
13/03/2015 16:03:19.000 - 13/03/2015 16:18:18.999	0 00:15:00.000	47.7 dB
13/03/2015 16:18:19.000 - 13/03/2015 16:33:18.999	0 00:15:00.000	47.4 dB
13/03/2015 16:33:19.000 - 13/03/2015 16:48:18.999	0 00:15:00.000	47.2 dB
13/03/2015 16:48:19.000 - 13/03/2015 17:03:18.999	0 00:15:00.000	47.5 dB
13/03/2015 17:03:19.000 - 13/03/2015 17:18:18.999	0 00:15:00.000	48.1 dB
13/03/2015 17:18:19.000 - 13/03/2015 17:33:18.999	0 00:15:00.000	47.6 dB
13/03/2015 17:33:19.000 - 13/03/2015 17:48:18.999	0 00:15:00.000	47.3 dB
13/03/2015 17:48:19.000 - 13/03/2015 18:03:18.999	0 00:15:00.000	46.4 dB
13/03/2015 18:03:19.000 - 13/03/2015 18:16:34.550	0 00:13:15.600	46.7 dB

9.0 Sample based survey numerical.

05/10/2018 15:46:29.000 - 05/10/2018 17:53:34.350

Effective duration (Profile)		L 90.0%: LAF(spl) (dB)
05/10/2018 15:46:29.000 - 05/10/2018 16:01:28.999	0 00:15:00.000	50.7 dB
05/10/2018 16:31:29.000 - 05/10/2018 16:46:28.999	0 00:15:00.000	51.0 dB
05/10/2018 16:46:29.000 - 05/10/2018 17:01:28.999	0 00:15:00.000	51.3 dB
05/10/2018 17:01:29.000 - 05/10/2018 17:16:28.999	0 00:15:00.000	51.1 dB
05/10/2018 17:16:29.000 - 05/10/2018 17:31:28.999	0 00:15:00.000	51.9 dB
05/10/2018 17:31:29.000 - 05/10/2018 17:46:28.999	0 00:15:00.000	51.4 dB
05/10/2018 17:46:29.000 - 05/10/2018 17:53:34.350	0 00:07:05.400	51.5 dB

10.0 Uncertainty consideration.

10.1 During both the early and late survey the weather condition was good with no wind, the measurement was taken during the period of interest but the early survey was taken in a cold month as opposed to the late survey that was taken at a time when temperature was around 20 Centigrades, for this

reason it can be said the late survey confirm the early results and the higher ambient noise readings are justified by the warmer weather which cause the hair dresser shop to operate with the rear door wide open for ventilation, this should be considered a transitory situation and the earlier survey result confirmed as conservative readings of the ambient noise in the area, for these circumstances uncertainty for the estimated background noise level will be low in the range of +/- 1-2 dB.

11.0 Instrumentation

11.1 Table showing instrumentation data.

Instrument type: Norsonic Sound Analyser Nor-140			Serial no: 1402725
Preamflifier type: Norsonic Type Nor-1209			Serial no: 12247
Microphone type: Norsonic Type Nor-1225			Serial no: 24301
UKAS ILAC periodic laboratory verification by:	UKAS ILAC LABORATORY 0789 CERTIFICATE U17345		
Date of last verification:	04/11/2014		
Calibrator type: Norsonic Type 1251			Serial no: 31943
UKAS ILAC periodic laboratory verification by:	UKAS ILAC LABORATORY 0789 CERTIFICATE U17243		
Date of last verification:	04/11/2014		
Measurement title: EA.			Date: 13/03/2015
Measurement duration: Sample based.		Period length: 15 min.	Filter bandwidth: (A) 1/1 Oct
Initial calibration level: 113.9 dB		Sampling frequency: 50 ms	End calibration level: 113.8 dB

Instrument type: Norsonic Sound Analyser Nor-140			Serial no: 1402725
Preamflifier type: Norsonic Type Nor-1209			Serial no: 12247
Microphone type: Norsonic Type Nor-1225			Serial no: 24301
UKAS ILAC periodic laboratory verification by:	 UKAS LABORATORY 0653 CERTIFICATE 09613		
Date of last verification:	08/12/16		
Calibrator type: Norsonic Type 1251			Serial no: 31943
UKAS ILAC periodic laboratory verification by:	 UKAS LABORATORY 0653 CERTIFICATE UCRT17/2118		
Date of last verification:	15/12/17		
Measurement title: EA assessment / sampling technique			Date: 05/10/2018
Measurement Continuous		Period length: 15 min.	Filter bandwidth: (A) 1/1

duration: sampling hours.	integration.				
Initial calibration level:	113.9 dB	Sampling frequency:	50 ms	End calibration level:	113.9 dB
Accelerometer:	Make: MMF	Model:	KS48C	Serial	14170

Personell:

Simone Longo
NMS principal consultant AMIOA MA
Third party accreditation:
ALP10/991-INAC260 Certificate of Competence in Acoustics (EU)
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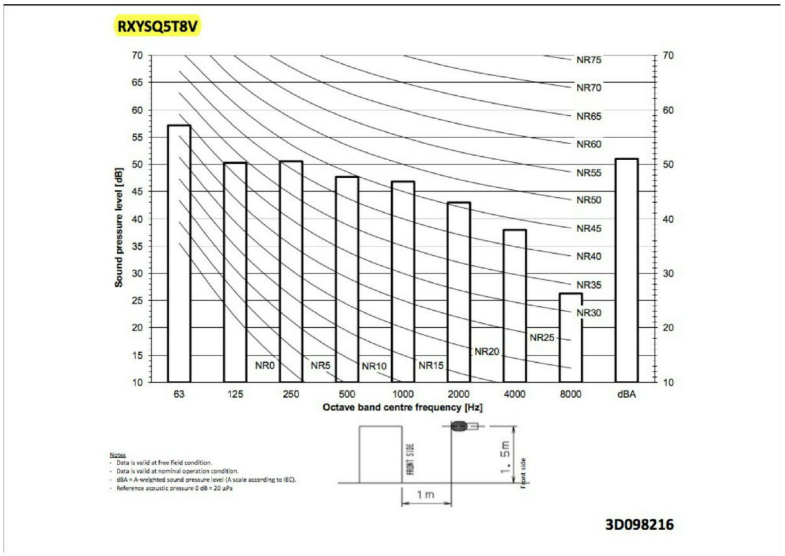
12.0 Specific noise emission.

12.1.1 Mark and model of the proposed unit object of this report (Heat pump) :

12.1.1.1 DAIKIN Model: RXYSQ5T8V

12.1.1.2 Manufacture noise emission data is given at 51dBA hemispherical free field, measured a 1 m from the unit.

12.1.2 Manufacture published Sound Pressure spectrum noise graph.



13.0 Noise emission predictive estimate.

13.1 As follow is a simplified predictive calculation to estimate the specific noise emission from the proposed plant to the nearest noise sensitive window.

13.1.1 The specific noise emission is given by the manufacture at 51dBA at 1 m free field, the floor reflection is taken into account as the emission noise is given as hemispherical radiation, the above graph also shows the measurement technique used.

13.1.2 To account for the specific installation site however a correction of 4.5 dBA is suggested to account for the effect of the rear wall, this cause the emission to rise at 55.5 dBA at 1m from the unit.

13.1.3 The distance from the installation position and facade "A" is 15 m therefore the noise emission measured at 1 m needs to travel 13 m to arrive at 1 m from the nearest sensitive window.

13.1.4 Another unit is installed on the side of the proposed unit, the existing unit noise emission at 1 m was calculated at 57.5 dBA.

13.1.5 The total noise emission from both units operating simultaneously can be calculated at 60 dBA.

13.1.6 Penalties correction.

13.1.6.1 It is unknown if the new proposed unit will emit tonal noise as this is not evident from the manufacture data, it must be assumed the unit does not emit tonal noise.

13.1.6.2 Impulsive noise is also unlikely due to the nature of the units, however two units operating simultaneously at similar noise level will certainly cause modulation noise, therefore a correction penalty of +7 dBA should be taken in consideration.

13.1.6.3 The calculated 60 dBA with penalty for modulation noise is now 67 dBA

13.1.7 A further correction needs to be added to the noise emission due to the façade reflection, a 3 dBA is suggested causing the specific emission to raise at 70 dBA.

13.1.8 70 dBA at 1 m equal to 48 dBA at 13 m.

13.1.9 To estimate the environmental noise impact of the unit, the calculated emission is subtracted from the lowest representative background noise 46 dBA LA90,15 min

13.1.9.1 The subtraction (48-46) indicates the unit noise emission is 2 dBA above background noise.

13.1.9.2 According with council requirements the unit emission noise should arrive at 10 dBA below background noise to the nearest noise sensitive facade therefore a noise mitigation must be studied to attenuate noise by 12 dBA.

14.0 Proposed mitigation measure.

14.1 In order to comply with regulations a further reduction of the noise emission should be achieve, the reduction should be no less than 12 dBA.

14.2 To achieve the specific noise reduction we suggest an acoustic screen made of two acoustic louvres arranged around the unit to form an enclosure.

14.3 Make and model n: Fantec Sound Bar Louvre – SBL1

14.4 Manufacture declared noise attenuation -12 dBA.

14.5 Enclosure make up.

14.6 As follow a graphic diagram to shows the enclosure make up and an indicative list of materials to be used, please note the sketch is indicative and not to scale.

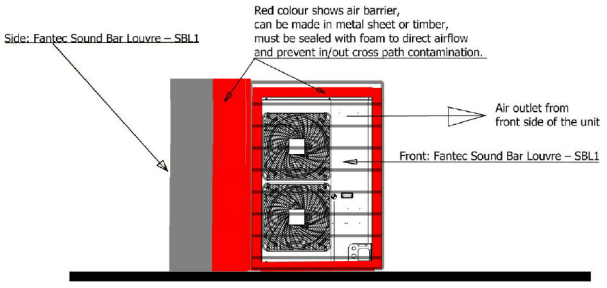
14.6.1 Air intake (side of the unit) 1 Fantec Sound Bar Louvre – SBL1

14.6.2 Output (front of the unit) 1 Fantec Sound Bar Louvre – SBL1

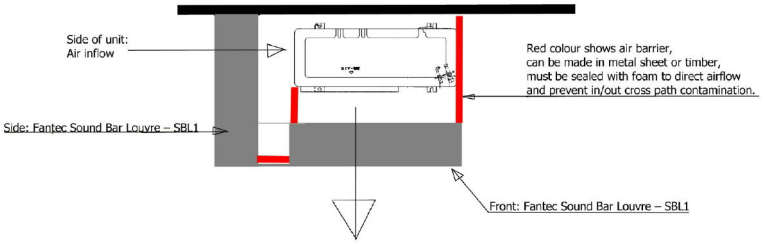
14.6.3 To form an enclosure the two sound bar louvre needs to be joined by additional barriers (marked in red) and to prevent recirculation of air from the outlet to the intake, the barrier walls can be made either in timber or metal sheet, as long as they form an air tight barrier to the air flow. For this purpose an acoustic mastic or foam can be used for sealing the gaps.

14.6.4 The top side and bottom side of the unit enclosure must be also closed as to form a forced circulation of air from the side intake to the front outlet.

Front View



Top View:
Shows internal
airflow diagram.



Front of unit: Air outflow

15.0 Conclusion.

15.1 The outcome of the survey finds an excess of noise and a suitable noise mitigation measure has been proposed in this report to reduce noise to the required 10 dBA below lowest background noise at the nearest receptor window.

15.2 With the suggested mitigation measure implemented there should be no objection to this application concerning noise, and planning permission should be granted.

Approved for Issue on behalf of
Noise Measurements & Solutions

[redacted]

Simone Longo
Acoustic Engineer MA - AMIOA – AIA
Founder and Director of NMS Acoustics.

Appendix A

SOURCE OF INFORMATION

Information used in this assessment has been obtained from the following sources:

- Planning Policy Guidance PPG24.
- BS8233: 1999 Sound Insulation and noise reduction for buildings – Code of Practice.
- BS4142: 1997 Method for rating industrial noise affecting mixed residential and industrial areas.
- BS7445: 1991: Description and measurement of environmental noise.
- Engineering and noise control Third edition.
- Acoustic calculations: NOR-Review software
- Inverse square law calculator web based at http://www.sengpielaudio.com/calculator-squarelaw.htm

Appendix B

GLOSSARY

dB Decibel. The decibel scale measures levels relative to a reference, either a fixed reference when measuring absolute levels, or another level when expressing changes. If the quantity is power- like (i.e. could be expressed in watts) the level in decibels is 10 times the common logarithm of the ratio of the measured quantity to the reference quantity. If the quantity is a physical amplitude such as pressure or voltage, and the power of the quantity is related to the its square, then the decibel level is 20 times the common logarithm of the ratio of the measured quantity to the reference quantity. Thus doubling of power gives a 3 dB increase, while a doubling of pressure gives a 6 dB increase.

L*A* A-weighted sound pressure level. The units are decibels, abbreviated dB (or dB(A) if the subscript A is omitted). A- weighting is a frequency weighting which discriminates against low frequency and very high frequency sound in order to approximate the frequency response of the human ear. The

subscript *s* or *f* signifies that the time constant of the measurement is either 'slow' (1 second) or 'fast' (125 milliseconds)

L*Amax* The maximum value of L*A* reached during one or more noise events. (See reference to '*s*' and '*f*' subscripts above).

L*Aeq,T* Equivalent continuous sound level. The root mean square sound pressure level determined over time interval T expressed in decibels. May be regarded as the level of a notional steady sound which has the same energy in period T as an actual time-varying sound which occurs in the same period. Sound level, duration and number of events are treated such that doubling the number of events, or doubling the duration of an event, has the same effect as doubling the number of sources (i.e. doubling the energy), which in the decibel scale is an increase of 3 dB (see above).

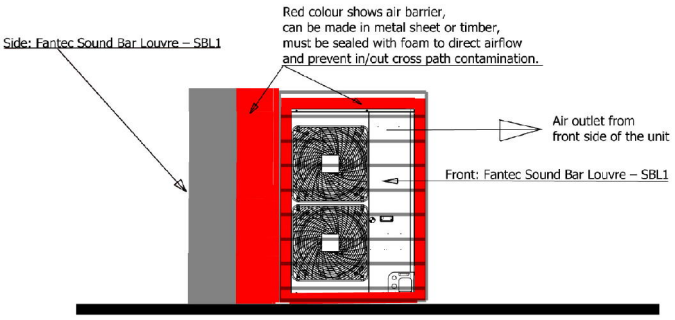
L*A10* The A-weighted sound level in dB which is exceeded for 10% of the time period stated.

ppv Peak particle velocity, the highest instantaneous velocity reached by a vibrating surface.

VDV Vibration Dose Value, the fourth root of the time integral of the fourth power of the frequency-weighted vibration velocity. The frequency weightings are specified in BS 6841:1987 and BS 6472:1992. The units are ms-1.75.

SELv Sound Exposure Level (or Single Event Level), the time integral of the squared sound pressure expressed in decibels. May be regarded as L*Aeq,T* normalised so that T is one second regardless of the actual duration of the event. Is used to construct L*Aeq,T* for a period containing many noise events, from knowledge of the SELv for each individual event.

Front View



Top View:
Shows internal
airflow diagram.