258 KILBURN HIGH ROAD, LONDON NW6 2BY

BS4142 NOISE ASSESSMENT

13 June 2016

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1.0 INTRODUCTION

Aran Acoustics has been appointed to carry out a noise impact assessment for a kitchen extract system at 258 Kilburn High Road, London NW6.

A noise survey and assessment has been requested by the Local Planning Authority to ensure that noise levels from the extract unit does not cause undue disturbance to nearby noise sensitive locations.

The purpose of this assessment is to determine the existing noise levels at the nearest noise sensitive location and establish maximum permissible noise levels for the proposed unit.

Such to establish suitable plant noise levels an assessment has been carried out to BS 4142: 2014 '*Method for rating and assessing industrial and commercial sound*'. This assessment has been benchmarked against an environmental noise survey carried out on 13 June 2016.

This report therefore describes the noise survey and its results. Figure 4.1 contains a graphical representation of the noise measurements taken on site. Section 5.0 provides the maximum permissible noise levels for the proposed plant. Section 6.0 provides an assessment of plant noise levels.

2.0 SITE DESCRIPTION

The site is located at 258 Kilburn High Road, London. The site currently contains an empty basement and ground floor commercial space with residential accommodation on the upper levels of the building.

Proposals are to renovate the basement and ground floor commercial unit for A3 use which includes installation of a kitchen extract unit to the rear of the premises. The nearest noise sensitive receptors to the proposed location of the kitchen extract unit are windows of residential flats above the commercial unit.

A subjective noise assessment on site identified a number of noise sources to impact the residential flats. It was noted that noise from other plant associated with adjacent commercial units were audible at the rear of the premises. This included an external condenser unit and ductwork associated with an existing extraction system. Additionally, background noise levels from road traffic on surrounding road was noted.

Figure 2.1 below shows a location map and aerial photo of the site and surrounding area.

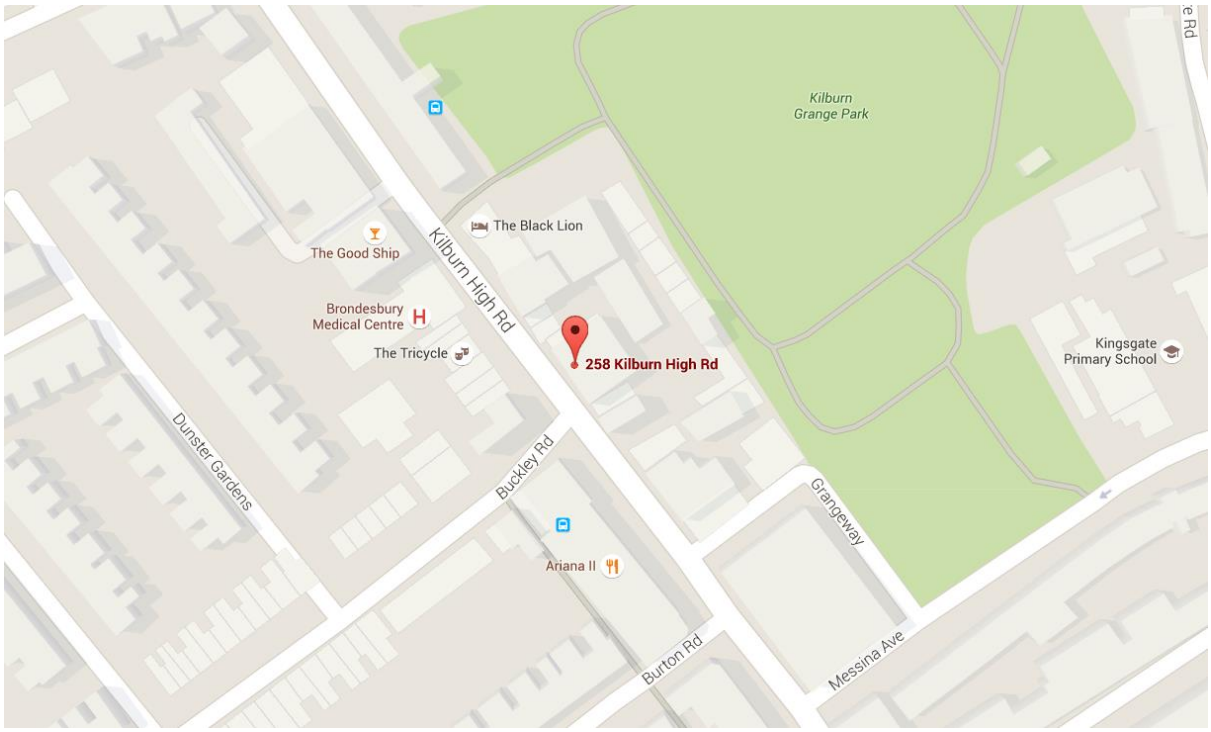


Figure 2.1 – Location map and aerial photo of the site

3.0 ENVIRONMENTAL NOISE SURVEY

A continuous 24-hour environmental noise survey was carried out between Monday 13 and Tuesday 14 June 2016.

A single noise monitor was placed on site and located to the rear of the premises at first floor level. At this location the microphone had no direct line of sight to road traffic due to existing buildings surrounding the site.

Noise levels measured at this location are considered representative of the existing environmental noise levels to impact the surrounding residential flats.

Figure 3.1 below provides a site photo of the microphone position.

Figure 3.1 - Site photos indicating measurement position

3.1 Measurement Equipment

The following measurement equipment was used, which complies with the performance specifications for a Class 1 device in accordance with BS EN 61672-1, BS EN 61260 and BS EN 60942.

Name	Serial Number	Last Calibrated	Calibration Due
CEL Precision Sound Analyser Type 490	128006	Sept 2015	Sept 2017
CEL Type 495 Pre-amplifier	011368	Sept 2015	Sept 2017
CEL Type 250 Microphone	3241	Sept 2015	Sept 2017
CEL Sound Calibrator Type 284	10023283	Sept 2015	Sept 2016

Table 3.1 – Measurement equipment used on site

The meter was calibrated before and after testing - no deviations were found. The meter was set to measure consecutive 'A' weighted 15-minute samples. This time period is in line with BS 4142 requirements.

3.2 Weather Conditions

The weather was fine and dry for the duration of the survey. Wind speed remained below 5 m/s. The temperature varied between approximately 14 - 20 ^{o}C.

The weather conditions were seen as suitable for the measurement of environmental noise in accordance with BS 7445-1:2003 '*Description and measurement of environmental noise'*.

4.0 SURVEY RESULTS

The noise levels measured during the survey period are shown in Figure 4.1 below. The full set of acoustic data measured on site is available upon request.

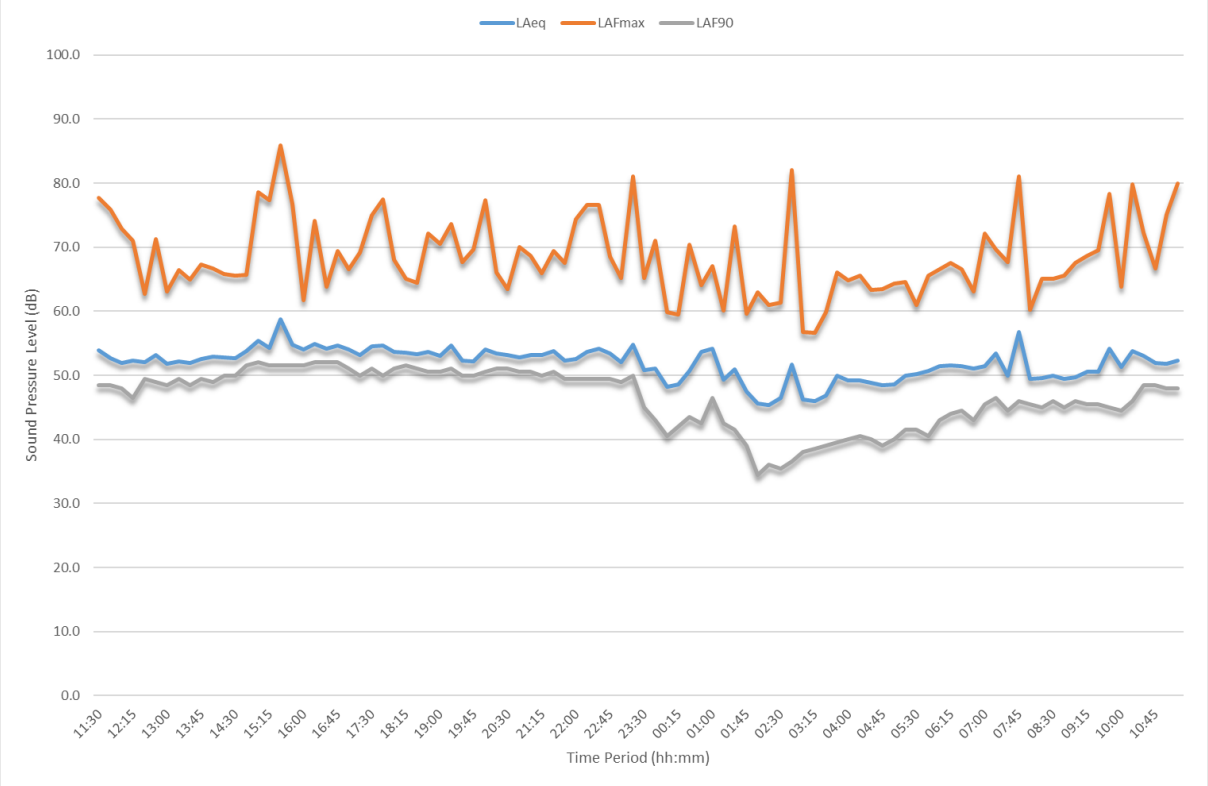


Figure 4.1 - Noise levels measured on site

It is seen from the graph above that the background noise level remained relatively constant throughout the day time period. This is considered attributable to the plant servicing the adjacent commercial premises.

The table below provides a summary of the noise levels measured on site at the fixed microphone position during the survey period including the representative background; L_{A90}.

Noise Descriptor	Daytime 07:00 – 23:00 hours	Night time 23:00 – 07:00 hours
Average Noise Level, L_{Aeq}	53.3	50.4
Representative Background, L_{A90}	49.5	43.0
Maximum Noise Level, L_{Amax}	85.9	82.0

Table 4.1 - Summary of measured noise levels

5.0 BS4142 ASSESSMENT CRITERIA

BS 4142:2014 describes a method of determining the level of noise of an industrial nature, together with the procedures for assessing whether the noise in question is likely to give rise to complaints from persons living in the vicinity. As such, an assessment to BS 4142 is typically called for within planning conditions.

The likelihood of complaints in response to a specific noise depends on various factors. BS 4142 assesses the likelihood of complaints by considering the margin by which the noise in question exceeds the background noise level. BS 4142 states that:

a) Typically, the greater this difference, the greater the magnitude of the impact.
b) A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.
c) A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.
d) The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.

This standard also allows for an appropriate correction for the acoustic features present in the noise using a number of methods. A correction should be applied if one or more of the following features (see the list below), are present within the noise sources in question.

- The noise is of a tonal nature, i.e. it contains a distinguishable, discreet, continuous note such as whine, hiss, screech, hum;
- The noise is impulsive, i.e. it contains distinct impulses such as bangs, clicks, clatters, or thumps;
- The noise contains other characteristics that are neither tonal nor impulsive but is irregular enough to attract attention.

5.1 Target Plant Noise Levels

It is understood the kitchen extract system will operate during the day time period only, i.e. between 07:00 to 23:00 hours, therefore Aran Acoustics propose that noise levels for the unit should not exceed -5 dB above the existing background noise level. This target has been imposed upon similar developments and is seen as a suitable design day time target where complaints are deemed unlikely.

It is considered that fans associated with typical extract units produce a broadband noise with no tonal features. These type of units are also inverter driven, meaning that the unit will gradually increase or decrease its operating capacity depending on the level of duty required. This gives a positive indication that the noise produced is not immediate or distinguishable therefore no correction need be applied to the results.

Based on the measured background noise level during the proposed operating period and the suggested design targets including any tolerance or correction factors the following table shows the maximum permissible noise level from the external condenser unit when measured at the window of the nearest residential receptor.

Measured Background L_{A90}	Tolerance Factor	Correction Factor	Max Noise Level at Residential
50 dBA	-5 dB	-0 dB	**45 dBA**

Table 5.1 - Plant Noise Level Target

Based upon the measurement results in Section 4.0 and noise level criteria provided within this section, it can be seen that noise levels from the proposed external condenser unit should not exceed 45 dBA at the nearest noise sensitive receptor.

Note that noise levels have been rounded to the nearest whole number for assessment purposes in accordance with BS4142:2014.

6.0 PLANT NOISE LEVEL ASSESSMENT

Current proposals are to install a kitchen extraction system within the ground floor kitchen to the rear of the premises as indicated on the drawings provided in Appendix A. Cooking fumes will be extracted through an external duct to the rear of the premises. The kitchen extraction system includes a 400mm Hydor in-line axial fan and 300mm Acoustica attenuator fitted to the system. Manufacturer's technical data sheets are provided in Appendix B.

Based on the proposed location of the duct outlet and distance to the nearest residential window, calculations were carried out to determine the noise level from the plant when measured at 1 metre from nearest residential window.

The proposed location of the duct outlet is estimated to be approximately 3 metres from the location of the nearest residential window with a limited line of sight. At this distance, noise levels from the duct outlet can be considered as a point source and sound will decay at a rate of 6dB per doubling of distance.

Calculations show that the noise levels from the proposed Kitchen extraction system including attenuation losses will be approximately **39 dBA** when measured at the nearest residential window. This does not exceed the target plant noise level of **45 dBA** within Table 5.1 therefore it is considered that complaints are unlikely. Plant noise calculation sheets are provided in Appendix C.

6.1 Additional Plant Noise Guidance

While the majority of noise from the proposed kitchen extract system is generated aerodynamically through the air, it is important to note that structure-borne noise may also be generated by vibration of the fan casing and motor. This may be transmitted through the building structure via the ductwork. It is therefore important to isolate the system from the building structure with the use of resilient mounts. Further guidance should be sought from the system manufacturer to prevent structure-borne noise transmission.

7.0 SUMMARY AND CONCLUSION

A noise survey was carried out at the proposed location for a kitchen extract system at 258 Kilburn High Road, London on the 13 June 2016.

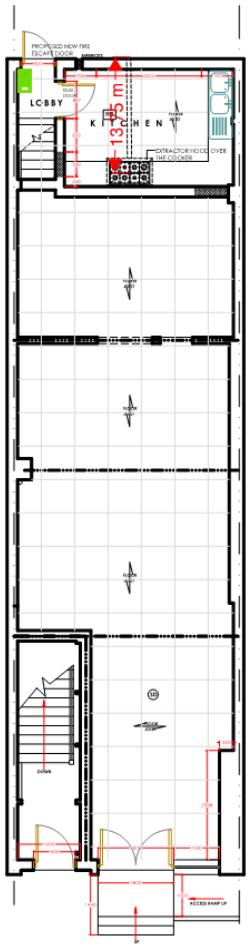
From this survey the representative background noise at the nearest sensitive property was found to be 5 dB L_{A90}.

Using guidance set out in BS 4142:2014, noise levels from the proposed kitchen extractor units should not exceed 52 dBA at the nearest noise sensitive window.

Based on manufacturer's noise level data for the extractor fan and with the inclusion of an acoustic attenuator, calculations show that noise levels at the nearest noise sensitive receptor would be approximately 39 dBA based on the proposed location. This does not exceed the maximum permissible noise level target of 45 dBA therefore complaints are deemed unlikely.

APPENDIX A – PROPOSED SITE PLANS

PROPOSED GROUND FLOOR PLAN
Scale 1:100 @ A3



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Preliminary

Client *

Project
258 KILBURN HIGH ROAD,
KILBURN, LONDON NW6 2BR

Drawing Title
PROPOSED GROUND FLOOR PLAN

E RILEY ASSOCIATES
CHARTERED SURVEYORS
8 HUXLEY PLACE
PALMERS GREEN, LONDON N13 5SU

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Scale: 1:100 at A3
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Date: July 2015
Drawing No: 1407-P05
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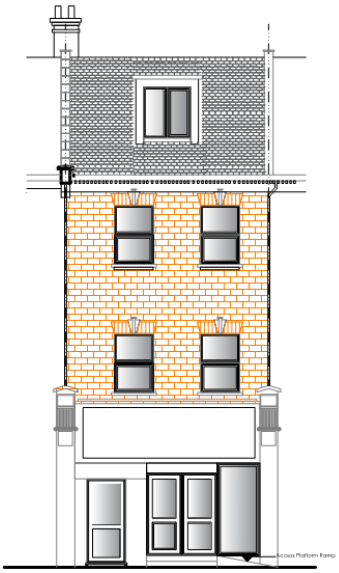
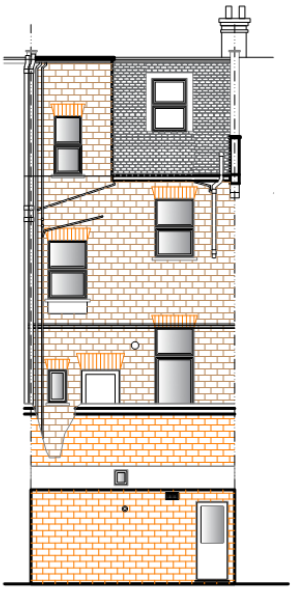


PROPOSED FRONT ELEVATION
Scale 1:100



PROPOSED REAR ELEVATION
Scale 1:100

Preliminary

Client

Project
258 KILBURN HIGH ROAD,
KILBURN, LONDON NW6 2BR

Drawing Title
PROPOSED ELEVATIONS

E RILEY ASSOCIATES
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APPENDIX B – MANUFACTURERS TECHNICAL DATA

hydor

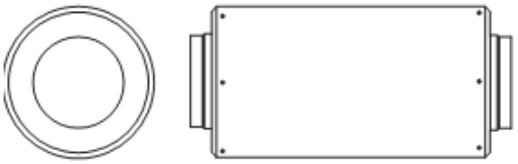
Sound Data

HP/HG Range

1Ph - SOUND POWER LEVEL SPECTRA

Product Code		Octave Band								dBA
		63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	@3m
HP250/2-1 / HG250/2-1	Inlet	74	82	76	75	72	68	64	58	57
	Outlet	74	83	76	76	74	71	66	59	58
HP300/4-1 / HG300/4-1	Inlet	76	78	73	67	64	61	55	47	50
	Outlet	73	76	71	65	62	59	54	45	48
HP350/4-1 / HG350/4-1	Inlet	77	79	76	72	70	64	56	48	54
	Outlet	76	78	74	70	68	63	57	48	52
HP400/4-1 / HG400/4-1	Inlet	77	80	78	73	70	66	60	53	55
	Outlet	77	80	77	73	70	67	61	52	55
HP450/4-1 / HG450/4-1	Inlet	81	88	82	77	75	71	65	57	60
	Outlet	81	86	80	77	76	71	65	57	60
HP500/4-1 / HG500/4-1	Inlet	86	84	82	77	76	72	66	57	60
	Outlet	84	85	82	78	76	71	65	57	60
HP560/4-1 / HG560/4-1	Inlet	80	88	84	80	77	75	68	60	62
	Outlet	81	87	84	79	77	74	68	60	62
HP400/6-1 / HG400/6-1	Inlet	74	75	77	64	62	55	48	41	50
	Outlet	77	76	69	65	62	58	51	45	47
HP450/6-1 / HG450/6-1	Inlet	77	76	69	65	61	58	51	44	47
	Outlet	77	76	68	65	62	58	51	44	47
HP500/6-1 / HG500/6-1	Inlet	80	77	72	70	67	62	55	46	51
	Outlet	79	78	72	70	67	62	55	46	52
HP560/6-1 / HG560/6-1	Inlet	79	83	73	71	68	65	59	52	54
	Outlet	78	81	74	71	67	64	57	48	53
HP630/6-1 / HG630/6-1	Inlet	86	94	81	78	73	70	65	59	61
	Outlet	85	94	81	79	73	70	66	58	61

ACOUSTICA™



SPIGOTTED DUCT MOUNTED SILENCER

Available in four standard lengths, M-Series Silencers have excellent attenuation properties, achieved with sound absorbing infill retained in the attenuator casing by a perforated galvanised steel liner.

- Fits directly into ISO diameter ducting
- Standard lengths 300, 600, 900 & 1200mm
- Use up to 70°C (standard construction)
- Systems up to 1000 Pascals
- 160mm and 300mm diameter available
- Special lengths on request

TYPICAL NOISE REDUCTION (dB) - CENTRE BAND FREQUENCY

PRODUCT CODE	DIA	LENGTH	63Hz	125Hz	250Hz	500Hz	1KHz	2KHz	4KHz	8KHz	MASS
CP01-M31-030	315	300mm	1	3	6	12	15	18	16	8	6 Kg
CP01-M31-060		600mm	3	5	8	16	21	22	16	14	11 Kg
CP01-M31-090		900mm	4	7	10	20	31	28	17	14	15 Kg
CP01-M31-120		1200mm	6	9	14	23	32	32	18	15	20 Kg
CP01-M35-030	355	300mm	1	3	6	12	15	18	16	8	7 Kg
CP01-M35-060		600mm	3	5	8	16	21	22	16	14	12 Kg
CP01-M35-090		900mm	4	7	10	20	31	28	17	14	18 Kg
CP01-M35-120		1200mm	6	9	14	23	32	32	18	15	23 Kg
CP01-M40-030	400	300mm	1	2	4	11	15	15	12	8	7 Kg
CP01-M40-060		600mm	2	4	7	14	17	18	14	11	12 Kg
CP01-M40-090		900mm	3	6	9	18	26	23	15	12	18 Kg
CP01-M40-120		1200mm	5	8	13	22	30	27	17	12	23 Kg
CP01-M45-030	450	300mm	1	1	4	10	14	15	12	7	8 Kg
CP01-M45-060		600mm	2	4	6	14	16	16	13	11	15 Kg
CP01-M45-090		900mm	3	6	8	17	24	21	15	11	22 Kg
CP01-M45-120		1200mm	4	8	13	20	29	25	16	11	32 Kg
CP01-M50-030	500	300mm	1	1	3	10	14	14	11	7	9 Kg
CP01-M50-060		600mm	2	4	6	14	16	16	13	11	16 Kg
CP01-M50-090		900mm	3	6	8	17	24	21	15	11	24 Kg
CP01-M50-120		1200mm	4	8	12	19	28	23	16	12	32 Kg

Typical noise reduction data is derived from continual testing to BS4718 and other standards in independent UKAS certified laboratories, which includes where appropriate, re-generated or self noise testing in both forward and reverse flow conditions. If you request system analysis from our technicians all predictions will be assessed using the relevant certified insertion loss data together with relevant dynamic corrections.

APPENDIX C – PLANT NOISE CALCULATION SHEET

		Octave Band Centre Frequency, Hz								
Description	**Parameter**	**63 Hz**	**125 Hz**	**250 Hz**	**500 Hz**	**1KHz**	**2KHz**	**4KHz**	**8 kHz**	**dBA**
Fan Sound Power Level, *Lw*	Outlet	77	80	77	73	70	67	61	52	-
Attenuator CP01-M40-030	Insertion Loss	-1	-2	-4	-11	-15	-15	-12	-8	-
Straight Section Attenuation/m	Unlined Circular Duct	-0.7	-0.7	-0.7	-0.1	-0.2	-0.2	-0.2	-	-
Duct Attenuation	17.8 m	-12.4	-12.4	-12.4	-1.8	-2.8	-2.8	-2.8	-0.9	-
Losses per bend	400 mm	0	0	0	-1	-2	-3	-3	-	-
Bend Losses	2	0	0	0	-2	-4	-6	-6	-5	-
End Reflection Loss	400 mm	-10	-5	-2	-1	0	0	0	0	-
Total Duct Losses	400 - 800	-22.4	-17.4	-14.4	-4.8	-6.8	-8.8	-8.8	-	-
Q Radiation Pattern	2	3	3	3	3	3	3	3	0	-
Distance Loss	3.0 m	-21	-21	-21	-21	-21	-21	-21	-21	-
Directivity Losses	90	0	0	0	0	0	0	0	0	-
Screening Losses	Barrier	0	0	0	0	0	0	0	-	-
Calculated Noise Level at Receptor		36	43	41	40	31	26	23	18	**39**