

# **259 Kentish Town Road, London NW5 2JT**

Environmental Noise Survey and Noise Impact Assessment Report 1109.02

Prepared for

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30 June 2018

By

**dba Acoustics**  
Acoustic Consultancy

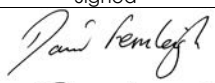

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- Time History Graphs
- Detailed Calculations
- Plant Data
- Supplier Information
- Definition of Terms

Report	Signed	Name and Position	Relevant Qualification
Undertaken and Prepared By		David Fernleigh Principal	MIOA
Checked By		David Fernleigh Principal	MIOA

This report has been prepared with all reasonable skill and care by dBA Acoustics for the Client named. The information contained herein is the property of, and confidential to, the Client. Any third party information required and/or provided for the completion of this report should not be considered as verified by dBA Acoustics, unless otherwise stated.

## 1.0 INTRODUCTION

New air conditioning plant is proposed for installation at the ground floor commercial unit at 259 Kentish Town Road, London NW5 2JT. Residential flats are located directly above.

The London Borough of Camden stipulates noise emission criteria to which new items of building services plant should comply.

dBA Acoustics have been commissioned to undertake an environmental noise survey and plant noise impact assessment in order to determine if the proposed plant meets the requirements of the Local Authority, and provide mitigation guidance, as/where necessary.

This report concerns the assessment and control of atmospheric noise emissions and vibration affecting neighbouring noise sensitive property for the purposes of planning. The assessment of noise affecting internal areas within the project site is outside the scope of this report. Detailed mechanical, structural, h&e and conservation considerations are beyond the expertise of this practice and should be dealt with by a relevant competent professional.

## 2.0 EXECUTIVE SUMMARY

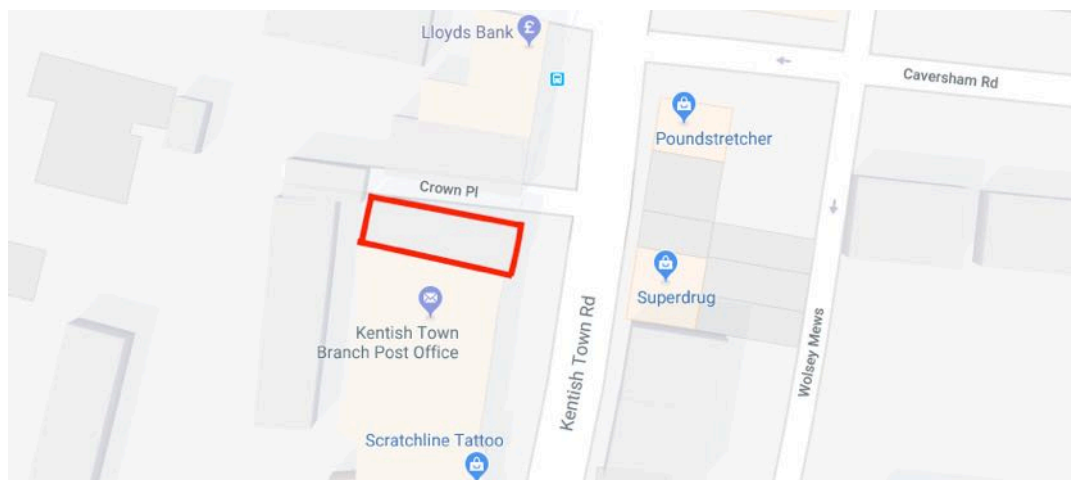
A manned and automated weekday/weekend environmental noise survey has been undertaken. The representative  $LA_{90}$  background noise level has been established for the operational times of the proposed plant.

The assessment undertaken indicates that, with the specified mitigation adopted, the plant noise emissions should comply with the requirements of the London Borough of Camden.

Specifications for in-line attenuation and a full enclosure have been provided.

## 3.0 THE SITE

259 Kentish Town Road is located on the west side of the road at the junction with Crown Place. The map below indicates the site boundary in red:



Map data © Google 2018 (North to the top of the page)

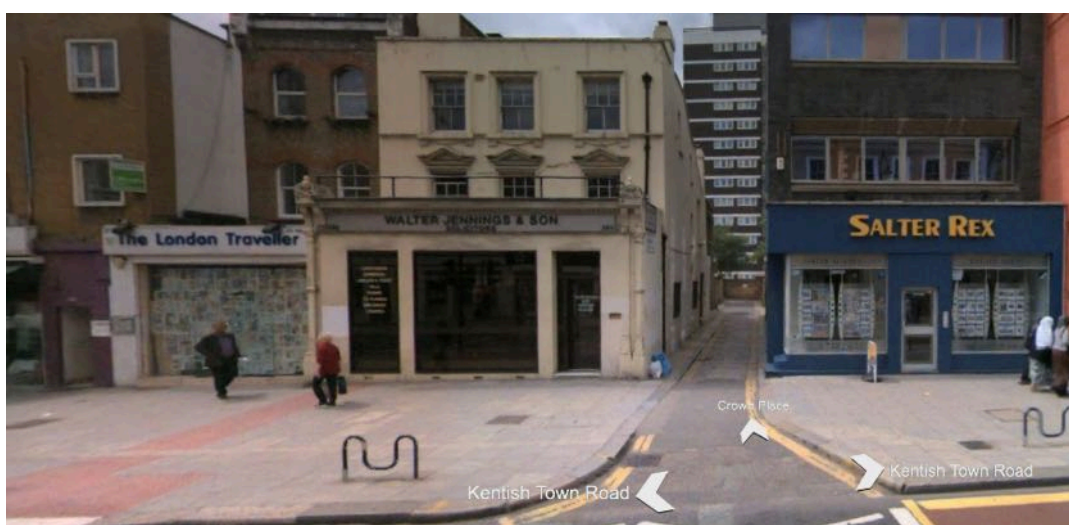
The image below indicates the approximate automated noise monitoring locations at the front flat roof (1) and rear courtyard (2). Subsequent manned measurements were also undertaken as position 3 in Crown Place:



Imagery © Google 2018 (West to the top of the page)

In both instances measurement positions 1 and 2 were within a few meters of the nearest noise sensitive receptor (located at flats directly above the commercial unit) and were deemed suitable for establishing representative background sound levels. There was no access to fix a sound level meter on the façade in Crown Place so manned measurements were undertaken at position 3 in Crown Place.

The image below shows the front of the property (previously Walter Jennings and Son) and adjacent buildings. The commercial unit at ground floor is the project site and protrudes from the upper floors by approximately 2.5m. This area has a flat roof and is not an amenity area/balcony:



Imagery © Microsoft 2018 (facing towards the west)

#### 4.0 MEASUREMENT METHODOLOGY

93hour environmental noise monitoring was undertaken commencing approximately 3pm on Friday 22 June to Monday 25 June 2018. The prevailing  $L_{A90}$  levels were logged at 15minute intervals throughout the survey period. The following sound level meters and calibrator was used:

Position 1 Front	SLM	Preamplifier	Microphone	Calibrator
Manufacturer	Norsonic AS	Norsonic AS	Norsonic AS	B&K
Type	140	1209	1225	4231
Serial No.	1405947	15793	215406	1839133
Latest Calibration	09/03/2018			20/11/2017
Certificate No.	27908			U27132

Position 2 Rear	SLM	Preamplifier	Microphone	Calibrator
Manufacturer	Norsonic AS	Norsonic AS	Gras	B&K
Type	140	1209	40AF	4231
Serial No.	1403413	12821	207390	1839133
Latest Calibration	16/01/2017			20/11/2017
Certificate No.	U24457			U27132

The UKAS accredited calibration of the sound level meter used complies with IEC 61672-1:2003 class 1.

Both sound level meters were installed approximately at first floor level with the microphone attached to a pole and fixed as far as possible in conditions such that they would approximate, or be equivalent to, the noise climate at the nearest noise sensitive windows. These windows being of Flats 1 and 2 located at first floor level above the project site.

Proprietary windshields and extension cables were deployed. The entire signal path was checked for calibration pre and post survey. The calibration reference level used was 114dB. The calibrated meter readings pre and post survey indicated no shift greater than 0.1dB on either meter.

The following table details the weather conditions at the beginning and end of the survey period:

Condition	Start	End
Wind Speed $\text{ms}^{-1}$	<2.8	<1.5
Wind Direction (from)	north	northeast
Precipitation or Fog	none	none
Wet Ground	none	none
Frozen Ground or Snow	none	none
Temperature $^{\circ}\text{C}$	22	28
Cloud Cover %	5	0

It is understood the weather over the survey period was fine with no precipitation or high winds.

During the manned periods at the beginning and end of the survey the prevailing ambient sound was noted to be general traffic noise at both positions, albeit less so to the rear.

The conditions measured or noted above were deemed acceptable for obtaining representative measurements.

In addition, two manned  $L_{A90,15\text{min}}$  measurements were undertaken on Wednesday 27<sup>th</sup> June in Crown Place between the hours of 19:00 – 20:00.

## 5.0 MEASUREMENT RESULTS

Time history graphs showing the  $L_{A90, 15\text{min}}$  measurements for the entire survey period are shown in the appendix.

The results of the manned  $L_{A90, 15\text{min}}$  measurements undertaken were 58.1 dB and 57.7 dB and indicate that levels at position 3 in Crown Place are approximately 3dB less than at position 1.

The proposed operational hours of the plant are as follows:

- Weekdays 08:00 – 20:00
- Weekends 10:00 - 19:00

The following table presents a summary of the lowest measured  $L_{A90, 15\text{min}}$  over the survey period during the operational times of the proposed plant:

Lowest measured $L_{A90, 15\text{min}}$ sound Level dB (ref : 20 $\mu$ Pa)		
Day	Position 1, Front	Position 2, Rear
Friday afternoon	60.1	42.4
Saturday	58.3	42.1
Sunday	57.5	40.6
Monday morning	59.3	42.0

## 6.0 CRITERIA

The London Borough of Camden have confirmed the following maximum noise emission criteria for new items of building services plant:

“Policy A4 of Camden Local Plan (2017), requires plant noise (façade level) to be 10dB below the background noise level at the nearest residential receptor. This is considered to be the Lowest Observed Adverse Effect Level (LOAEL).”

Based on the survey results and the Local Authority requirements detailed above the following table presents the maximum allowable plant noise emissions at the residential receptors:

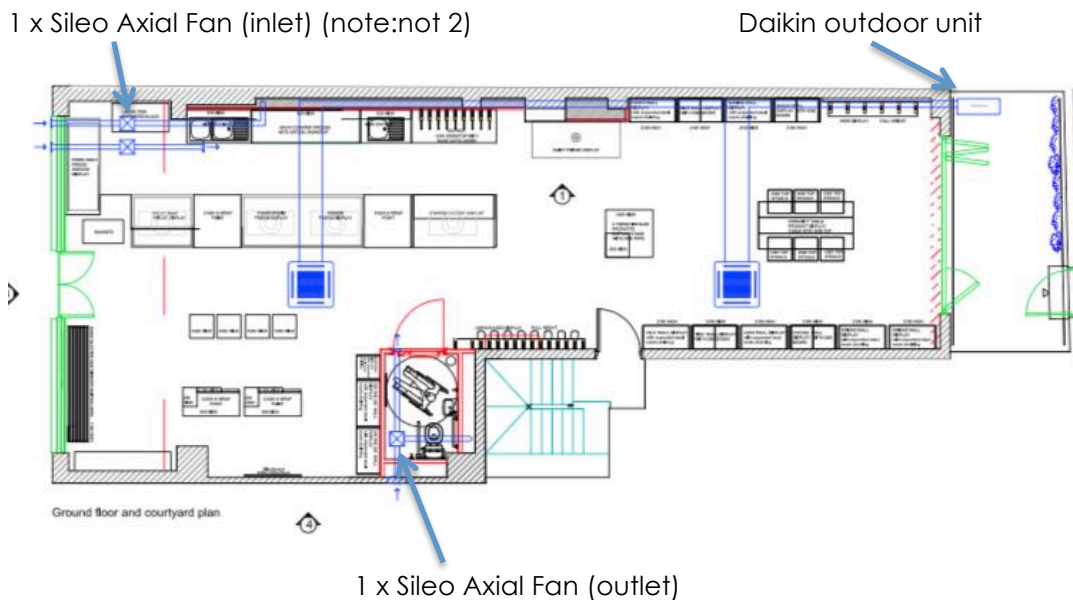
Plant noise emission limit $L_{Aeq,T}$ sound Level dB (ref : 20 $\mu$ Pa)			
Maximum plant noise emissions at nearest noise sensitive receptor facade	Position 1, Front	Position 2, Rear	Position 3, Side
		48 dB	31 dB

## 7.0 PLANT NOISE ASSESSMENT

The proposals include the following:

- A Daikin RXY SQ-TY1 air conditioning outdoor unit to be located at ground floor level in the rear courtyard approximately 3m from the nearest noise sensitive receptor at Flat 2 situated directly above.
- 2No. identical Systemair AR 400E4-L Sileo fans located internally with atmospheric inlet grille on the front façade just below ground floor ceiling height (1no. fan unit only, not 2no. as shown on the drawing below) and the exhaust grille discharging from the toilet into Crown Place. In both cases the nearest residential receptors are windows of Flat 1 above. The grilles are at a distance from the windows of approximately 2.5m and 2m respectively.

Plant locations shown in the ducting layout drawing below:



### Kentish Town Road, Position 1, Front

The manufacturers noise data for the internally located Systemair supply fan is as follows:

Sound Power Level at Octave Band Centre Frequency Hz dB(A)									
	63	125	250	500	1k	2k	4k	8k	Total
Inlet	45	52	52	59	65	67	65	56	71

The nearest residential receptor is located at Flat 1 above the commercial unit. Flat 1 is set back at least 2.5m from the front of the commercial unit where the grille is proposed for location. The location of the fan grille is therefore considered to be well screened by the first floor roof building edge and further has strong directivity 180 degrees away from the nearest receptor at Flat 1. Calculations indicate that the estimated noise emissions from this grille is insignificant, being at least 20dB below the criteria. Detailed calculations are contained in the appendix.

Provided the unit is properly installed distinguishing or impulsive sound characteristics are not anticipated.

The proposals should comply with the requirements of the London Borough of Camden for non-tonal, non-impulsive plant.

### **Crown Place, Position 3, Side**

The manufacturers noise data for the internally located Systemair extract fan is as follows:

Sound Power Level at Octave Band Centre Frequency Hz dB(A)									
	63	125	250	500	1k	2k	4k	8k	Total
Outlet	44	51	54	60	65	67	65	56	71

The nearest residential receptor is located at Flat 1 above the commercial unit. The outlet grille is expected to be at least 2m from the nearest residential window in the same façade. It is understood the windows are fixed. In calculating the plant noise emissions the direct noise path (2m) has been added to the 1st reflected noise path (6m) plus a 6dB penalty for reverberant conditions in Crown place applied. Noise emissions at the nearest residential window are estimated to be approximately 15dB above the criteria. Detailed calculations are contained in the appendix. The fan will therefore require attenuation.

### **Mitigation Recommendations, Position 3, Side:**

Noise emissions should be adequately reduced by way of an in-line attenuator installed on the atmospheric side of the fan. The attenuator should achieve the following minimum insertion loss.

Minimum Insertion Loss at Octave Band Centre Frequency Hz dB							
63	125	250	500	1k	2k	4k	8k
2	3	5	9	18	20	16	10

For guidance, the above acoustic performance should typically be achievable with a 450mm long podded circular attenuator.

Provided the unit is properly installed distinguishing or impulsive sound characteristics are not anticipated.

Provided the above insertion loss is provided the proposals should comply with the requirements of the London Borough of Camden for non-tonal, non-impulsive plant.

### **Rear Courtyard, Position 2, Rear**

The Daikin outdoor unit is proposed for installation at the rear of the property at low level. The manufactures noise data for the proposed unit is contained in the appendix. The unit has been deliberately oversized and is proposed to be run exclusively in quiet mode, of which there are three levels, step 1, step 2 and step 3.

The table below shows the distance loss, reflections and screening corrections that have been applied to the manufacturers noise data in order to estimate the



likely noise emissions at the receptor:

<b>Estimated plant noise level at nearest noise sensitive windows at position 2, above rear courtyard</b>	
Maximum air condenser noise emissions at 1m (quiet mode steps 1 / 2 and 3)	47 / 44 / 41
3m propagation	-9.5
Q eight spherical mounting conditions	+9
Additional reflections	+3
Line of sight screening	0
Estimated rating level at receptor	50 / 47 / 44
Criteria $L_{Aeq,T}$	31
Excess over criteria (quiet mode steps 1 / 2 and 3 )	19 / 16 / 13

From the table above it can be seen that noise emissions from the proposed Daikin outdoor unit are estimated to be 19dB, 16dB and 13dB above the Local Authority criteria for quiet mode steps 1, 2 and 3 respectively. It is understood that there is no alternative location for the unit. As such the outdoor unit will have to be fully enclosed.

#### **Mitigation Recommendation, Position 2, Rear Courtyard:**

Irrespective of the quiet mode selected, adoption of the following limiting noise specification should result in compliance with the Local Authorities requirements:

Enclosure Limiting Noise Level Specification
The (in-situ <sup>1</sup> ) noise emissions measured at 1m in any direction from the enclosure, with the unit inside operating at maximum operational duty, must not exceed 28dB

<sup>1</sup> Specification includes an allowance for eighth spherical mounting conditions and 3dB additional reflections

<sup>2</sup> The enclosed unit should be suitably vibration isolated

Provided the unit is properly installed distinguishing or impulsive sound characteristics are not anticipated.

Please find contact details for suitable suppliers in the appendix.

Provided the above enclosure limiting noise level specification is met the proposals should comply with the requirements of the London Borough of Camden for non-tonal, non-impulsive plant.

## 8.0 VIBRATION CONTROL

High levels of vibration are not expected. However, the equipment locations are structurally linked to residential property above. To avoid the likelihood of unwanted vibration from the equipment transmitting into residential properties it is good practice and recommended that the equipment is suitably isolated from the supporting structure.

Rubber/neoprene isolators with a minimum static deflection of 6mm should be adequate for an outdoor unit of this size. However, this may need to be reviewed depending on the rpm at the design running quiet mode and the enclosure conditions.

Provided the structure supporting the internally located fans is suitably rigid (allowing no deflection due to the weight of the equipment) rubber or neoprene vibration isolation hangers/mounts with a minimum static deflection of 8mm should provide adequate isolation. If the supporting structure is not stiff it is recommended that supply/installation specialists adjust the mount specification or stiffen the structure accordingly. Please see contact details of suitable suppliers in

the appendix.

Duct and pipework penetrations through the building envelope should be resiliently sleeved.

Flexible duct connections should be incorporated on both sides of each fan.

There should not be any solid bridge from any services to the isolated fan(s), for example via rigid cable trays. Electrical connection to the fans should be made via looped flexible conduit.

## 9.0 CONCLUSION

An automated 93hour environmental noise survey has been undertaken. The representative  $L_{A90}$  background noise level has been established.

The subsequent assessment undertaken indicates that noise emissions from the proposed plant comply with the requirements of London Borough of Camden at the front of the building.

With the inclusion of an in-line attenuator, as specified, noise emissions from the proposed plant comply with the requirements of London Borough of Camden at the side of the building.

By fully enclosing the outdoor unit to the specified noise limit, noise emissions from the proposed plant should comply with the requirements of London Borough of Camden at the rear of the building.

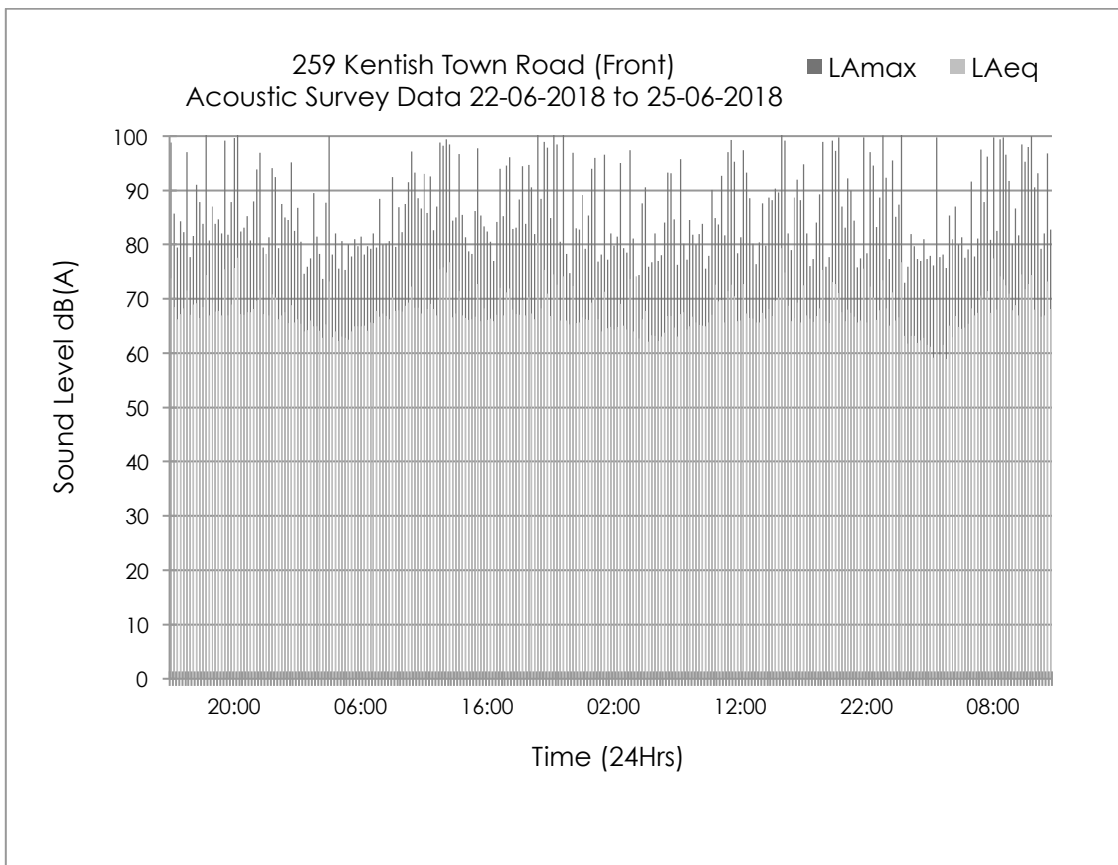
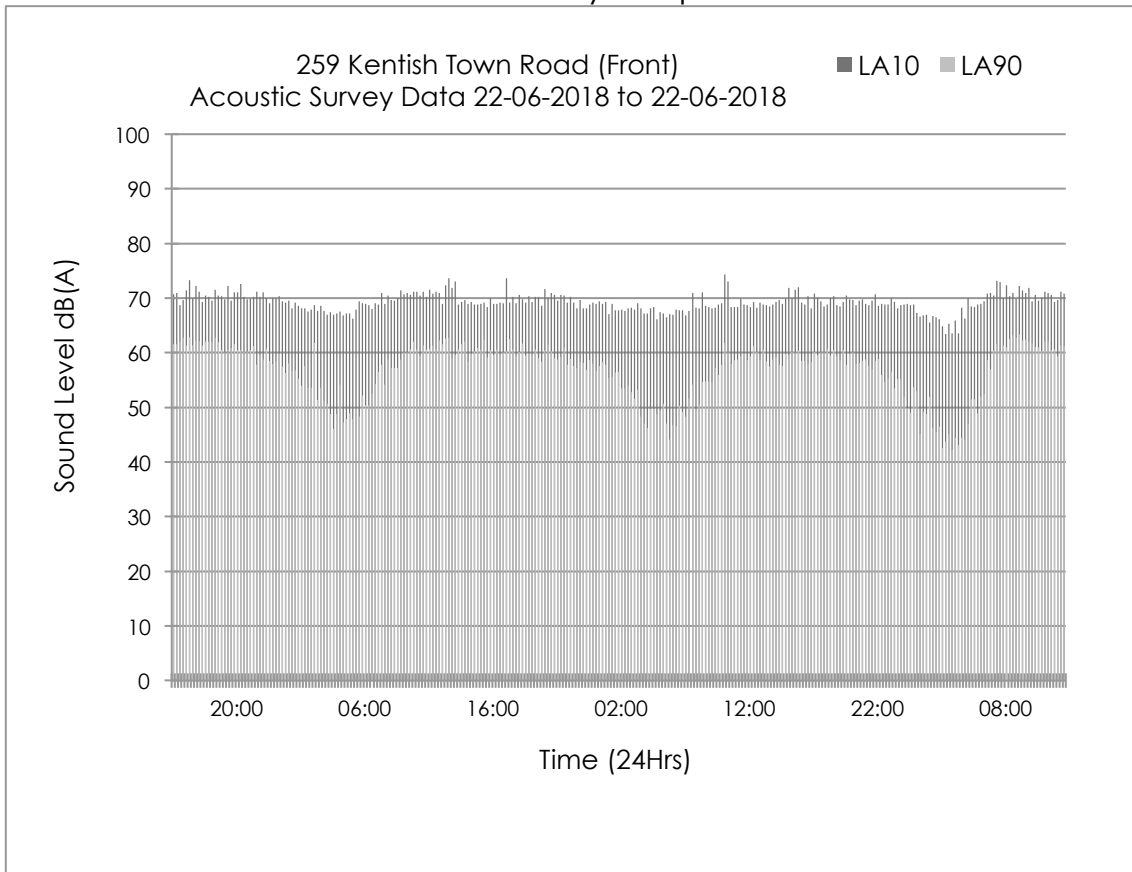
The proposals are subject to the final planning approval of The London Borough of Camden.

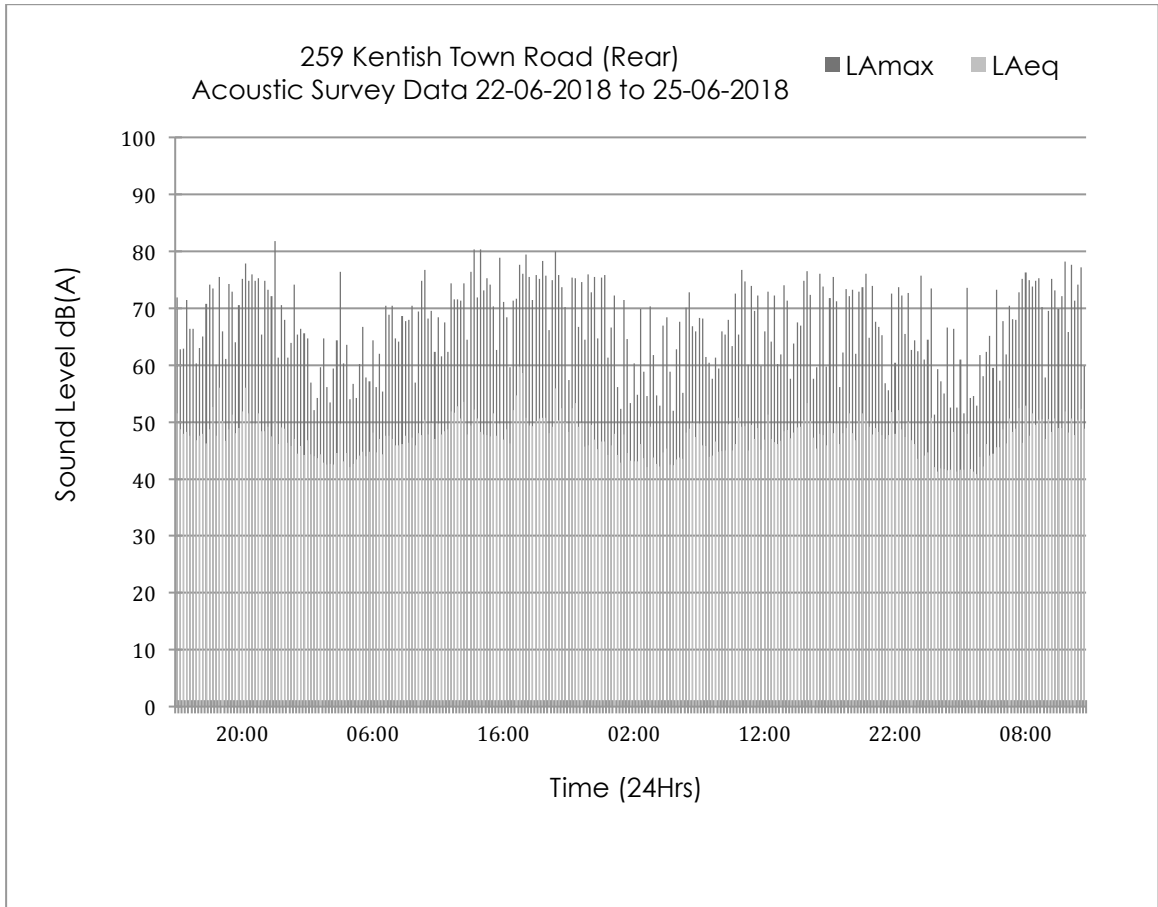
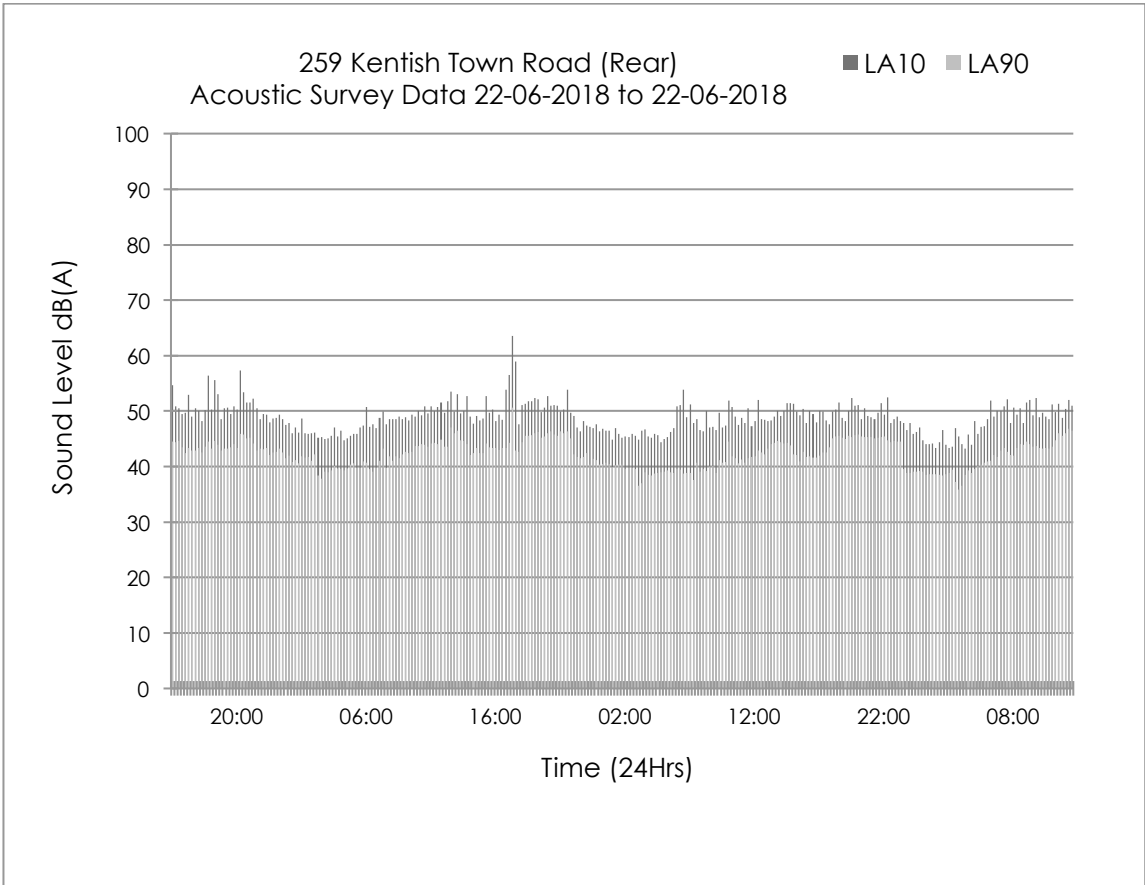
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## APPENDIX

Time History Graphs  
Detailed Calculations  
Plant Data  
Supplier Information  
Definition of Terms

## Time History Graphs







# Plant Data

DAIKIN • Outdoor Unit • RXYSQ-TY1

## 1 Features

Space saving solution without compromising on efficiency

- Space saving trunk design for flexible installation
- Covers all thermal needs of a building via a single point of contact: accurate temperature control, ventilation, air handling units and Biddle air curtains
- Wide range of indoor units: either connect VRV or stylish indoor units such as Daikin Emura, Nexura ...
- Wide range of units (4 to 12HP) suitable for projects up to 200m<sup>2</sup> with space limitations
- Incorporates VRV IV standards & technologies: Variable Refrigerant Temperature and full inverter compressors
- Customize your VRV for best seasonal efficiency & comfort with the weather dependant Variable Refrigerant Temperature function. Increased seasonal efficiency with up to 28%. No more cold draft by supply of high outblow temperatures
- VRV configurator software for the fastest and most accurate commissioning, configuration and customisation
- 3 steps in night quiet mode: step 1: 47dBA, step 2: 44 dBA, step 3: 41 dBA
- Possibility to limit peak power consumption between 30 and 80%, for example during periods with high power demand
- Connectable to all VRV control systems
- Keep your system in top condition via our i-Net service: 24/7 monitoring for maximum efficiency, extended lifetime, immediate service support thanks to failure prediction and a clear understanding of operability and usage



Fan motor	Quantity			2						
	Output	W		70			200			
	Model			Brushless DC motor						
Sound power level	Cooling	Nom.	dBA	68 (4)	69 (4)	70 (4)	73 (4)	74 (4)	76 (4)	
Sound pressure level	Cooling	Nom.	dBA	50 (5)	51 (5)		55 (5)			57 (5)
Operation range	Cooling	Min.-Max.	°CDB	-5-46			-5-52			
	Heating	Min.-Max.	°CWB	-20-15.5						

## AR 400E4-L SILEO AXIAL FAN

Item no. 34467

Document type: **Product card**  
 Document date: **2016-06-23**  
 Generated by: **Systemair Online Catalogue**

### Description

- speed controllable by voltage reduction
- inlet protection guard
- safe and maintenance free operation
- can be installed in any mounting position
- electric connection via terminal box mounted on the casing
- supplied with capacitor

Axial fans of the AR sileo range do have a bionic shape of the fan blade, and are driven by external rotor motors. The AR range is mounted in a round casing according Eurovent 1/2, galvanized steel and powder coated in black (RAL9005). The axial impeller is manufactured from black high efficiency composite material. The impeller is balanced dynamically in two levels in accordance with DIN ISO 1940 part 1, quality G6.3.

The motors are equipped with thermal contacts for motor protection, with leads to be connected to a motor protection unit, for example Systemair unit S-ET.



### Technical parameters

Voltage	230	V
Frequency	50	Hz
Phase	1	~
Input power (P1)	260	W
Current	1,15	A
Max. airflow	1226	l/s
R.p.m.	1320	r.p.m.
Max. temperature of transported air	55	°C
Max. temperature of transported air when speed-controlled	55	°C
Sound pressure level at 1 m	66	dB(A)

### Acoustic data

Sound power level		63	125	250	500	1k	2k	4k	8k	Tot
Inlet	dB(A)	45	52	52	59	65	67	65	56	71
Outlet	dB(A)	44	51	54	60	65	67	65	56	71



## Supplier Information

### Proprietary Acoustic Enclosures for Condensers

Environ Technologies Ltd  
Regus House,  
1010 Cambourne Business Park,  
Cambourne,  
Cambridgeshire, UK. CB23 6DP  
Tel: 0870 383 3344  
[www.environ.co.uk](http://www.environ.co.uk)

Noise Solutions Ltd  
Unit 6, LDL BusinessCentre,  
Station Road West,  
Ash Vale,  
Aldershot GU12 5RT  
Tel: 01252 519881  
[www.noisesolutions.co.uk](http://www.noisesolutions.co.uk)

Attenuators suppliers, Vibration isolation hardware suppliers/installers:

Environmental Equipment  
Corporation Ltd  
Richmond House, Churchfield Road  
Walton-on-Thames, Surrey  
KT12 2TP  
Tel: +44 (0) 1932 230940  
Email: [info@eecnoisecontrol.co.uk](mailto:info@eecnoisecontrol.co.uk)  
Web: <http://eec.co.uk>

Noise Solutions Ltd  
Unit 6, LDL Business Centre,  
Station Road West,  
Ash Vale,  
Aldershot GU12 5RT  
Tel: 01252 519881  
[www.noisesolutions.co.uk](http://www.noisesolutions.co.uk)

## Definition of Terms

**$L_{Aeq,T}$**  is the equivalent continuous A-weighted sound pressure level defined IN BS4142:2014 as the value of the A-weighted sound pressure level in decibels of continuous steady sound that, within a specified time interval,  $T = t_2 - t_1$ , has the same mean-squared sound pressure as a sound that varies with time.

**$L_{A90}$**  is the background sound level as defined in BS4142:2014 as the A-weighted sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given time interval,  $T$ , measured using time weighting F and quoted to the nearest whole number of decibels.

**Background Sound Level** is the  $L_{A90}$ , see above.

**Ambient Sound** as defined by BS4142:2014 is the totally encompassing sound in a given situation at a given time, usually composed of sound from many sources near and far.

**Tonal Characteristic** as defined by BS4142:2014 Annex C: For a prominent, discrete tone to be identified as present, the time-averaged  $L_{Zeq,T}$  sound pressure level in the one-third-octave band of interest is required to exceed the time-averaged  $L_{Zeq,T}$  sound pressure levels of both adjacent one-third-octave bands by some constant level difference.

The level differences between adjacent one-third-octave bands that identify a tone are:

- 15 dB in the low-frequency one-third-octave bands (25 Hz to 125 Hz);
- 8 dB in the middle-frequency one-third-octave bands (160 Hz to 400 Hz); and
- 5 dB in the high-frequency one-third-octave bands (500 Hz to 10 000 Hz).

**WHO** refers to the World Health Organisation.