Rosa's Thai Cafe
26 Earlham Street
London
WC2H 9LN

Plant noise commissioning test

On behalf of

Rosa's Thai Cafe

Project Reference: 12th February 2020| Revision: 00 | Date: 12th February 2020

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Document Information

Project Name	:	**26 Earlham Street, Rosa's Thai**
Project Reference	:	**88299**
Report Title	:	**Plant noise commissioning test**
Doc Reference	:	**88299/NIA**
Date	:	**12th February 2020**

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Revision	Date	Description	Prepared	Reviewed/ Approved

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Appendices

1.0 Introduction and background

1.1. Noise Solutions Ltd (NSL) has been appointed by Rosa's Thai to undertake plant noise testing at Rosa's Thai on Earlham Street in London in order to commission a supply fan unit following the installation of mitigation measures. These works have been carried out in response to noise complaints received from neighbouring residents.

1.2. Following a noise survey in January 2019 undertaken by Noise Solution Limited (NSL), it was found that the noise levels from the plant were significantly above the planning requirements. Rosa's Thai submitted a planning application for the installation of a replacement supply fan system, which was approved and the work was subsequently carried out.

1.3. NSL re-attended site in February 2020 in order to commission the new plant. This report presents the results of that survey.

2.0 Site conditions

2.1. The existing restaurant occupies the whole of 26 Earlham Street. The kitchen is located in the basement; the restaurant occupies the ground to second floors, with an office for the restaurant on the upper floor.

2.2. The ventilation system consists of a kitchen extract fan and a supply fan. Both of these systems are located to the south of the restaurant in a lightwell. The supply system, which has recently been re-designed (including enclosure within an acoustic housing), is at ground level. The kitchen extract discharge (which is extant and not part of the current planning application) is ducted to the roof of the building and discharges at roof level.

2.3. A kitchen extract serving another premises is also located in the lightwell and is similarly ducted to roof level.

3.0 Nearest noise sensitive receptors

3.1. The area surrounding the site is mixed residential and commercial in use. A review of the council tax website confirmed that the nearest noise sensitive property to the plant is the flat located on the upper floor of 24 Earlham Street, approximately 7m away from the supply system and 3m away from the discharge of the extract system. The nearest windows are partially screened from the plant by the building structure.

4.0 Existing noise climate

4.1. An environmental noise survey was undertaken to establish the typical background sound levels at a location representative of the noise climate outside the façades of the nearest noise sensitive receptors to the proposed plant area during the quietest times at which the plant will operate.

4.2. The results of the environmental sound survey are summarised in Table 1 below. The full set of measurement results and details of the survey methodology are presented in **Appendix C**.

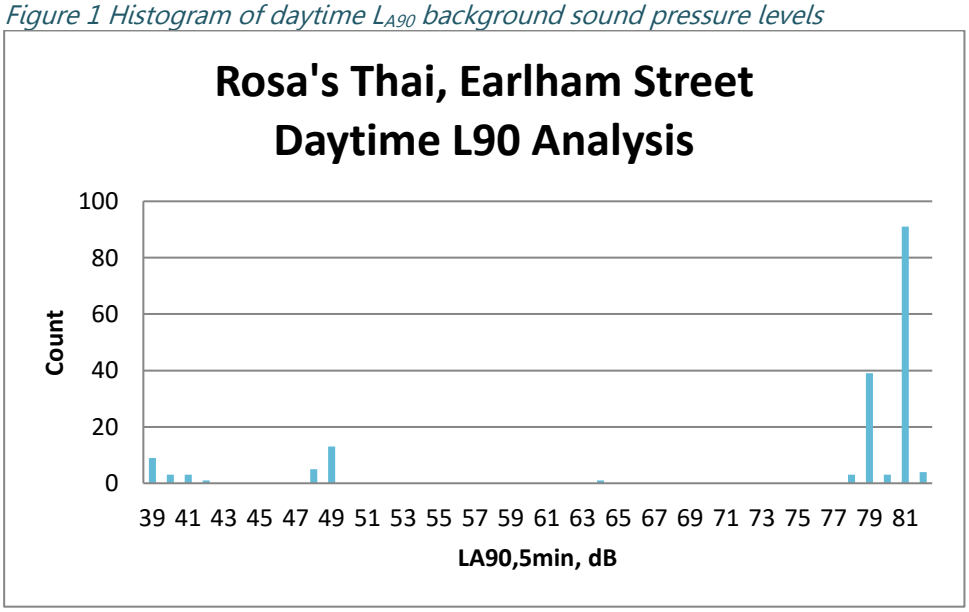
4.3. It is understood that for the majority of the daytime period, the noise climate was dominated by plant from Rosa's Thai and other commercial units. The meter was therefore set to integrate over five-minute intervals in order to establish the background noise level during periods when the plant is switched off.

Table 1 Summary of survey results

Measurement period	Range of recorded sound pressure levels (dB)			
	$L_{Aeq(5mins)}$	$L_{Amax(5mins)}$	$L_{A10(5mins)}$	$L_{A90(5mins)}$
Daytime (07.00 – 23.00 hours)	41-82	47-84	42-83	39-82
Night-time (23.00 – 07.00 hours)	38-47	43-60	39-49	35-42

4.4. As the plant will only be operating during the daytime only these hours will be considered.

Figure 1 Histogram of daytime L_{A90} background sound pressure levels



4.5. It can be seen that for the majority of the time the existing plant noise was dominant. However, there are clearly identifiable periods when the plant switches off. In order to be robust, the lowest recorded interval of 39 dB has been selected to be representative of the background noise climate during the daytime when the plant is not running.

4.6. Due to access restrictions, the sound level meter had to be positioned at the bottom of the lightwell. A representative value was taken when all of the plant items in the lightwell were switched off. However, as the meter is significantly more screened from surrounding noise sources than the meter location, 44 dB has been chosen to be representative of the background noise level at the receptor window.

5.0 Noise assessment criteria

London Borough of Camden

5.1. Planning decision notice for planning application 2019/1307/P from the London Borough of Camden contains the following condition relating to noise for the installation of the supply fan.

> *Noise levels at a point 1 metre external to sensitive facades shall be at least 10dB(A) less than the existing background measurement (LA90), expressed in dB(A) when all plant/equipment (or any part of it) is in operation unless the plant/equipment hereby permitted will have a noise that has a distinguishable, discrete continuous note (whine, hiss, screech, hum) and/or if there are distinct impulses (bangs, clicks, clatters, thumps), then the noise levels from that piece of plant/equipment at any sensitive façade shall be at least 15dB(A) below the LA90, expressed in dB(A).*
>
> *Reason: To safeguard the amenities of the adjoining premises and the area generally in accordance with the requirements of policies A1 and A4 of the London Borough of Camden Local Plan 2017.*

Summary of criteria

5.2. Based on the above criteria, the plant noise rating level should not exceed **34dB** at 1m from the residential receptor window.

6.0 Plant noise impact assessment

6.1. As the planning application refers only to the supply fan, this assessment is limited to that system.

Survey methodology

6.2. Measurements of existing plant noise emissions were undertaken between 10.00 and 11.30 on Monday 10th February. Weather conditions were conducive to the measurement of sound pressure levels during both surveys and are documented in **Appendix C**.

6.3. Noise measurements were taken at the closest accessible location to the window of the complainant, a window at the top of the light-well at the top floor of Rosa's Thai. It is noted that the complainant's window is further from the plant and benefits from additional screening compared to the measurement location. As such, the following readings are louder than would occur at the assessment location.

Plant noise survey results

6.4. The results of the plant noise measurements are summarised in Table 2, below.

Table 2 Plant noise measurements at nearest receptors

Plant item	Measurement position	Specific noise level, L_{A90} (dB)
Supply fan	Top floor window of Rosa's Thai	50
All plant off	Top floor window of Rosa's Thai	49

Note 1: The noise levels presented above have been corrected for residual noise.

Assessment of plant noise levels

6.5. Table 3 below presents an assessment of current plant noise emissions in accordance with the planning condition imposed by the London Borough of Camden. The results at the receptor are inclusive of 6 dB of screening between the plant and the receptor and an appropriate distance correction.

Table 3 Assessment of current specific plant noise levels

Plant item	Assessment position	Specific noise level, L_{A90} (dB)	Design criteria, L_{A90} (dB)	Difference (dB)
Supply fan	Receptor	33	34	-1

6.6. The results of the survey indicate that noise from the supply fan meets the requirements in the planning application without any further treatment needed. Therefore, it is recommended that the planning condition is discharged.

7.0 Summary

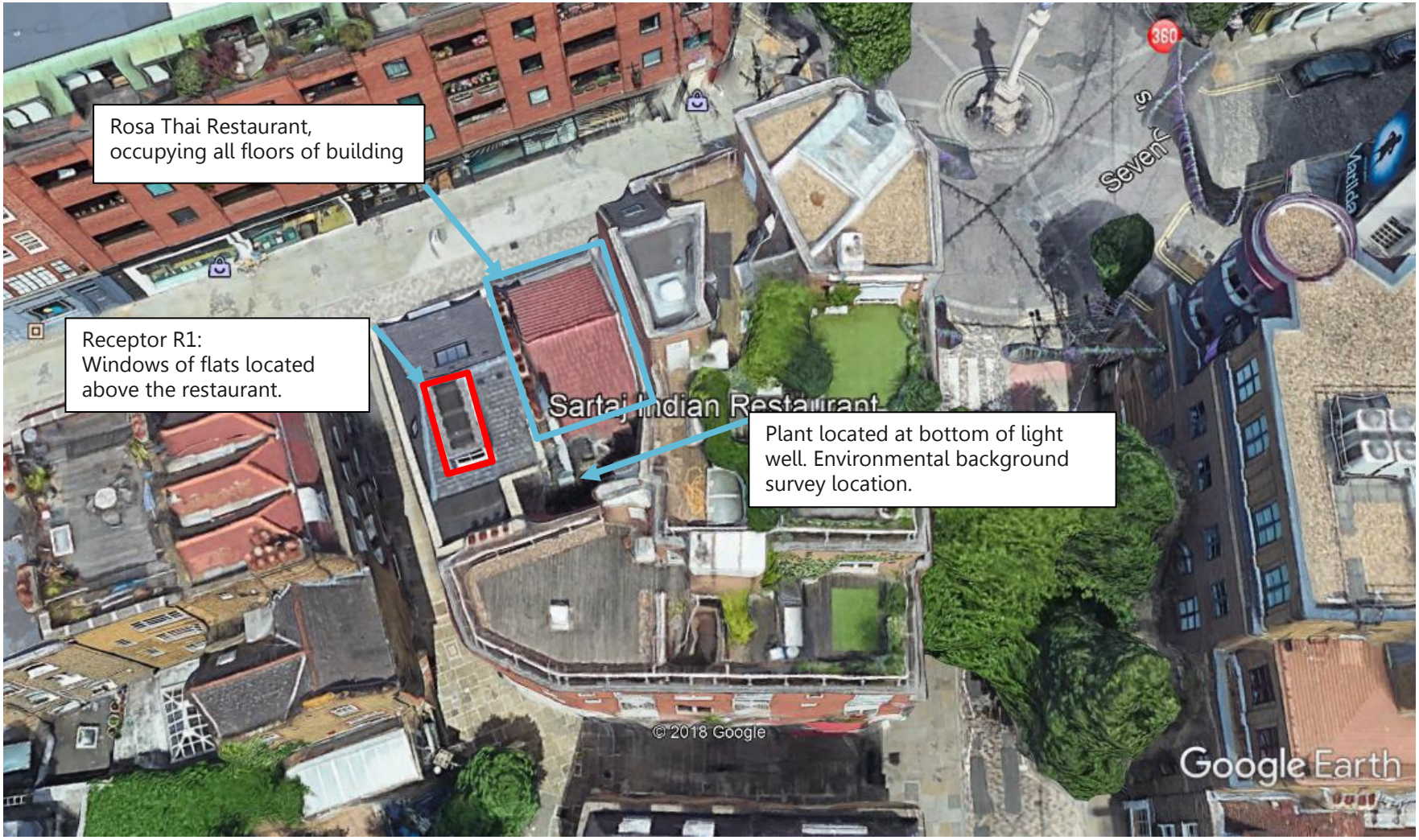
7.1. Noise Solutions Ltd (NSL) has been appointed by Rosa's Thai to undertake a plant noise commissioning test at Rosa's Thai, 26 Earlham Street in order to establish the plant noise levels of the supply fan serving the restaurant, following a refit carried out by Rosa's Thai in response to complaints by residents. The results have been assessed against a planning condition for the replacement of the supply fan at the restaurant.

7.2. The results of the assessment indicate that the replacement plant is in compliance with the planning condition set by the local authority, therefore the condition should be discharged.

Appendix A Acoustic terminology

Parameter	Description
Ambient Noise Level	The totally encompassing sound in a given situation at a given time, usually composed of a sound from many sources both distant and near ($L_{Aeq,T}$).
Decibel (dB)	A scale for comparing the ratios of two quantities, including sound pressure and sound power. The difference in level between two sounds s1 and s2 is given by 20 log10 (s1/s2). The decibel can also be used to measure absolute quantities by specifying a reference value that fixes one point on the scale. For sound pressure, the reference value is 20μPa. The threshold of normal hearing is in the region of 0 dB and 140 dB is the threshold of pain. A change of 1 dB is only perceptible under controlled conditions.
dB(A), L_{Ax}	Decibels measured on a sound level meter incorporating a frequency weighting (A weighting) which differentiates between sounds of different frequency (pitch) in a similar way to the human ear. Measurements in dB(A) broadly agree with people's assessment of loudness. A change of 3 dB(A) is the minimum perceptible under normal conditions, and a change of 10 dB(A) corresponds roughly to halving or doubling the loudness of a sound. The background noise in a living room may be about 30 dB(A); normal conversation about 60 dB(A) at 1 metre; heavy road traffic about 80 dB(A) at 10 metres; the level near a pneumatic drill about 100 dB(A).
Fast Time Weighting	Setting on sound level meter, denoted by a subscript F that determines the speed at which the instrument responds to changes in the amplitude of any measured signal. The fast time weighting can lead to higher values than the slow time weighting when rapidly changing signals are measured. The average time constant for the fast response setting is 0.125 (1/8) seconds.
Free-field	Sound pressure level measured outside, far away from reflecting surfaces (except the ground), usually taken to mean at least 3.5 metres
Façade	Sound pressure level measured at a distance of 1 metre in front of a large sound reflecting object such as a building façade.
$L_{Aeq,T}$	A noise level index called the equivalent continuous noise level over the time period T. This is the level of a notional steady sound that would contain the same amount of sound energy as the actual, possibly fluctuating, sound that was recorded.
$L_{max,T}$	A noise level index defined as the maximum noise level recorded during a noise event with a period T. L_{max} is sometimes used for the assessment of occasional loud noises, which may have little effect on the overall L_{eq} noise level but will still affect the noise environment. Unless described otherwise, it is measured using the 'fast' sound level meter response.
$L_{10,T}$	A noise level index. The noise level exceeded for 10% of the time over the period T. L_{10} can be considered to be the "average maximum" noise level. Generally used to describe road traffic noise. $L_{A10,18h}$ is the A –weighted arithmetic average of the 18 hourly $L_{A10,1h}$ values from 06:00-24:00.
$L_{90,T}$	A noise level index. The noise level that is exceeded for 90% of the measurement time interval, T. It gives an indication of the lower levels of fluctuating noise. It is often used to describe the background noise level and can be considered to be the "average minimum" noise level and is a term used to describe the level to which non-specific noise falls during quiet spells, when there is lull in passing traffic for example.

Appendix B Aerial photograph showing key areas and elevation view identifying receptors



Photograph 1 Courtesy of Google Earth ©


Air intake

Appendix C Noise Surveys

Details of noise surveys

C.1 Measurements of the existing background noise levels were undertaken between 10.40 hours on Wednesday 23rd January and 09.30 hours on Thursday 24th January 2019. The sound level meter was programmed to record the A-weighted L_{eq}, L_{90}, L_{10} and L_{max} noise indices for consecutive five-minute sample periods for the duration of the noise survey.

C.2 In addition, a plant noise survey was carried out on Monday 10th February from 10.00 hours to 11.30 hours.

Measurement position

C.3 The sound level meter for the environmental noise survey was positioned in the lightwell near to the plant in an area representative of the nearest residential receptor (approximate location indicated on the site plan in **Appendix B**. In accordance with BS 7445-2:1991 *'Description and measurement of environmental noise – Part 2: Guide to the acquisition of data pertinent to land use'*, the measurements were taken under free-field conditions).

C.4 Plant noise readings were taken at the top floor window of Rosa's Thai.

Equipment

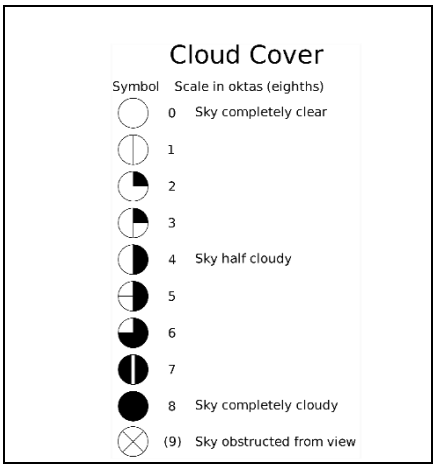
C.5 Details of the equipment used during the surveys are provided in the table below. The sound level meters were calibrated before and after the surveys; no significant change (+/-0.2 dB) in the calibration level was noted.

Equipment used for noise surveys

Description	Model / serial no.	Calibration date	Calibration certificate no.
Class 1 Sound level meter	Svantek 977/ 69747	17/10/2018	Factory conformity declaration
Condenser microphone	ACO Pacific 7052E / 70829		
Preamplifier	Svantek SV12L / 73687		
Calibrator	Svantek SV 40A / 10843	26/09/2018	14010559
Class 1 Sound level meter	Svantek 977/ 81301	31/10/2019	14013747-01
Condenser microphone	ACO Pacific 7052E / 74660		
Preamplifier	Svantek SV12L / 86561		
Calibrator	Svantek SV 33B / 83850	29/10/2019	14013747-02

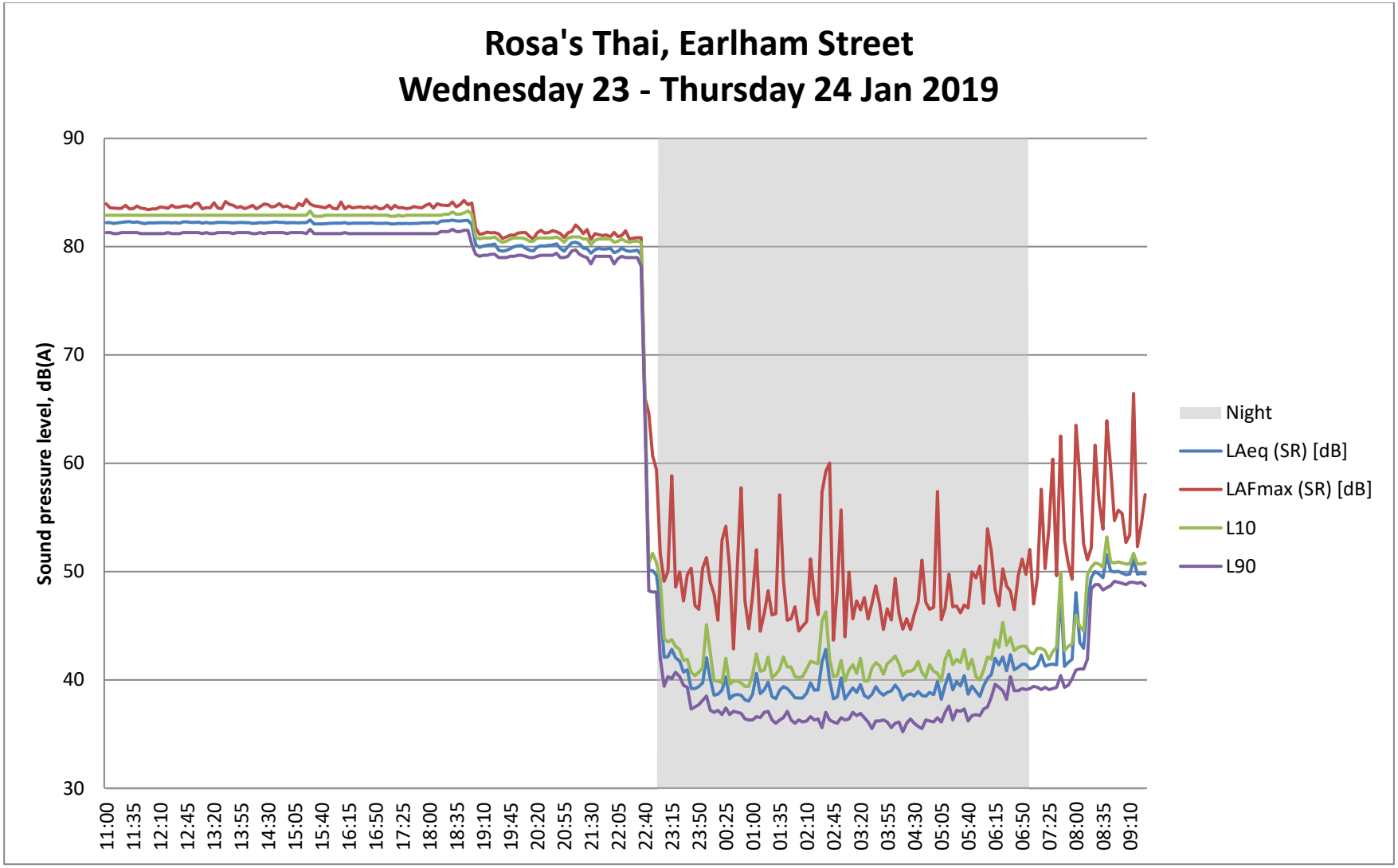
Weather conditions

C.6 Weather conditions were determined both at the start and on completion of the environmental noise survey. It is considered that the meteorological conditions were appropriate for environmental noise measurements. The table below presents the weather conditions recorded on site at the beginning and end of the environmental noise survey. Appropriate weather conditions were also present during the course of the plant noise surveys.

Weather Conditions				
Measurement Location	**Date/Time**	**Description**	**Beginning of Survey**	**End of Survey**
As indicated on Appendix B	23/01/2019 10:40 – 24/01/2019 9:30	Temperature (°C)	2	1
		Precipitation:	No	Light rain
		Cloud cover (oktas - see guide)	4	7
		Presence of fog/snow/ice	No	Yes
		Presence of damp roads/wet ground	No	No
		Wind Speed (m/s)	-	-
		Wind Direction	-	-
		Conditions that may cause temperature inversion (i.e. calm nights with no cloud)	No	No

Results

C.7 The noise climate at the measuring location was dominated by plant noise from Rosa's Thai and one other restaurant unit. The results of the survey are presented in a time history graph overleaf.


Rosa's Thai, Earlham Street
Wednesday 23 - Thursday 24 Jan 2019
Sound pressure level, dB(A)
90
80
70
60
50
40
30
11:00
11:35
12:10
12:45
13:20
13:55
14:30
15:05
15:40
16:15
16:50
17:25
18:00
18:35
19:10
19:45
20:20
20:55
21:30
22:05
22:40
23:15
23:50
00:25
01:00
01:35
02:10
02:45
03:20
03:55
04:30
05:05
05:40
06:15
06:50
07:25
08:00
08:35
09:10
Night
LAeq (SR) [dB]
LAFmax (SR) [dB]
L10
L90