Noise Solutions Ltd

Dr. Anish Shah

18 Temple Mead Close
London
HA7 3RG

Plant Noise Impact Assessment

On behalf of
Dr. Anish Shah

Project Reference: 88567 | Revision: 00 | Date: 14th June 2019

T: 01252 519881
W: noisesolutions.co.uk
E: hello@noisesolutions.co.uk
Noise Solutions Ltd, Unit 5, Oriel Court, Omega Park, Alton, GU34 2YT Reg no. 3483481

Document Information

Project Name	:	**335 Kentish Town Road**
Project Reference	:	**88567**
Report Title	:	**Plant Noise Impact Assessment**
Doc Reference	:	**88567/NIA**
Date	:	**14th June 2019**

	Name	Qualifications	Initials	Date
Prepared by:	Danny Bhatt	BSc (Hons), MSc, AMIOA	DB	14th June 2019
Reviewed and approved by:	Nigel Chandler	BSc(Hons) MIOA	NAC	14th June 2019
For and on behalf of Noise Solutions Ltd				

Revision	Date	Description	Prepared	Reviewed/ Approved

Reg no. 3483481 Trading office 5 Oriel Court, Omega Park, Alton, GU34 2YT

Contents

Appendices

Executive summary

Noise Solutions Limited has carried out a noise impact assessment of the existing AC plant serving Café Nero on Kentish Town Road, London on proposed new residential dwellings adjoining the site.

The results of the assessment demonstrate that the AC plant must be attenuated to comply with the local authority's typically accepted noise criteria. It is recommended that this is provided using an acoustic enclosure to each unit, to prevent issues of air recirculation through the use of an acoustic screen.

Should the recommendation by NSL be followed, there would not be a reason for the refusal of planning permission.

1.0 Introduction

1.1. Noise Solutions Ltd (NSL) has been commissioned by Dr. Anish Shah to provide a noise impact assessment of the existing AC plant, serving Café Nero, on the proposed new residential development at 335 Kentish Town Road, London.

1.2. An environmental sound survey has been undertaken to establish the prevailing background sound pressure levels at a location representative of the sound levels outside the nearest noise sensitive receptors to the site.

1.3. Cumulative plant noise emission levels for the existing plant have been predicted at the most affected noise sensitive receptors and assessed against the requirements of London Borough of Camden Council.

1.4. To assist with the understanding of this report a glossary of acoustic terms can be found in **Appendix A**. An in-depth glossary of acoustic terms can be viewed online at www.acoustic-glossary.co.uk.

2.0 Details of the development

2.1. The proposal is for the redevelopment of the site to provide five residential apartments, three occupying the existing building at 335 Kentish Town Road (Flat C, D & E) and two apartments within a new 3-storey building on York Mews (Flat A & B).

2.2. It is proposed that a 2-storey extension is to be built at the rear of 335 Kentish Town Road (Flat C & D) with the bedrooms facing the rear courtyard. Flat A has the kitchen (at first floor level) facing the courtyard and the bedroom of Flat B (second floor level) is also facing the courtyard.

2.3. The AC units that serve Café Nero are located centrally between the two proposed buildings. It is proposed to enclose the AC units within acoustic enclosures to achieve the required attenuation to satisfy the council criteria.

2.4. The operational hours of the café are 06:30 to 19:30 hours Monday to Friday, 07:00 to 19:30 hours on Saturday and 07:30 to 19:30 hours on Sunday.

3.0 Nearest noise sensitive receptors

3.1. The bedrooms of Flat C & D (Receptors R1a and R1b) face the courtyard and are approximately 5m from the nearest AC plant. The kitchen and bedroom of Flat A & B (Receptors R2a & R2b) also face the courtyard and are approximately 6m from the nearest AC plant.

3.2. A site plan showing the site and surrounding area, the nearest noise sensitive properties and noise monitoring location used in this assessment is presented in **Appendix B**.

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**.

Table 1 Summary of survey results

Measurement period	Range of recorded sound pressure levels (dB)			
	$L_{Aeq(15mins)}$	$L_{AFmax(15mins)}$	$L_{A10(15mins)}$	$L_{A90(15mins)}$
Daytime (07.00 – 23.00 hours)	52-69	66-98	54-63	46-54
Night-time (23.00 – 07.00 hours)	49-58	61-84	50-60	42-50
Café Nero plant operating hours (06:30 – 19:30 hours)	53-69	66-98	55-62	46-54

4.3. The lowest existing background sound pressure levels at nearby noise sensitive premises are therefore:

- 46dB L_{A90} during the daytime period;
- 42dB L_{A90} during the night-time period;
- 46dB L_{A90} during Café Nero plant operating period.

5.0 Plant noise design criteria

National Planning Policy Framework

5.1. A new edition of NPPF was published in February 2019 and came into effect immediately. The original National Planning Policy Framework (NPPF[1]) was published in March 2012, with a revision in July 2018 - this document replaced the existing Planning Policy Guidance Note 24 (PPG 24) "Planning and Noise." The 2019 revised edition contains no new directions or guidance with

[1] National Planning Policy Framework, DCLG, March 2012

respect to noise, and hence, all previous references remain extant. The paragraph references quoted below relate to the February 2019 edition.

5.2. Paragraph 170 of the NPPF states that the planning system should contribute to and enhance the natural and local environment by, (amongst others) *"preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, water or noise pollution or land stability."*

5.3. The NPPF goes on to state in Paragraph 180:

" planning policies and decisions should ...

a) Mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development, - and avoid noise giving rise to significant adverse impacts on health and quality of life;
b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason ...

5.4. The NPPF document does not refer to any other documents or British Standards regarding noise other than the Noise Policy Statement for England (NPSE[2]).

5.5. Paragraph 2 of the NPPF states that *"planning law requires that applications for planning permission must be determined in accordance with the development plan unless material considerations indicate otherwise."*

5.6. Paragraph 12 of the NPPF states that *"The presumption in favour of sustainable development does not change the statutory status of the development plan as the starting point for decision making. Where a planning application conflicts with an up-to-date development plan (including any neighbourhood plans that form part of the development plan), permission should not usually be granted. Local planning authorities may take decisions that depart from an up-to-date development plan, but only if material considerations in a particular case indicate that the plan should not be followed"*.

5.7. Paragraph 117 states that *"Planning policies and decisions should promote an effective use of land in meeting the need for homes and other uses, while safeguarding and improving the environment and ensuring safe and healthy living conditions. Strategic policies should set out a clear strategy for accommodating objectively assessed needs, in a way that makes as much use as possible of previously-developed or 'brownfield' land"*.

[2] Noise Policy Statement for England, DEFRA, March 2010

London Borough of Camden

5.8. Pre-application advice provided by London Borough of Camden[3] requires an assessment of the noise impact of plant associated with the commercial units on the proposed new dwellings.

5.9. Section 6 of the Camden Planning Guidance Amenity, published March 2018, gives guidance on noise and vibration.

5.10. Clause 6.8 refers noise thresholds within Appendix 3 of the Local Plan and to refers to the principles of No observed effect level (NOEL), Lowest observable adverse effect level (LOAEL) and Significant observed adverse effect level (SOAEL) and defines their meanings. Specifically, in the context of this report, LOAEL is defined as:

> *The level above which changes in behaviour (e.g. closing windows for periods of the day) and adverse effects on health (e.g. sleep disturbance) and quality of life can be detected.*

5.11. SOEAL is defined as:

> *The level above which adverse effects on health and quality of life occur. This could include psychological stress, regular sleep deprivation and loss of appetite.*

5.12. Clause 6.27 states that:

> *Developments proposing plant, ventilation, air extraction or conditioning equipment and flues will need to provide the system's technical specifications to the council accompanying any acoustic report. "BS4142 Method for rating Industrial and Commercial Sound' contains guidance and standards which should also be considered within the acoustic report.*

5.13. Appendix 3 within the Camden Local Plan published 2017 states:

> *"A relevant standard or guidance document should be referenced when determining values for LOAEL and SOAEL for non-anonymous noise. Where appropriate and within the scope of the document it is expected that British Standard 4142:2014 'Methods for rating and assessing industrial and commercial sound' (BS 4142) will be used. For such cases a 'Rating Level' of 10 dB below background (15dB if tonal components are present) should be considered as the design criterion)."*

5.14. Table 2 of the appendix states the criteria at which development related noise levels will be acceptable:

[3] 2018/4203/PRE, dated 20 December 2018

Table 2: Noise levels applicable to proposed industrial and commercial development (including plant and machinery)

Existing Noise sensitive receptor	Assessment Location	Design Period	LOAEL (green)	LOAEL to SOAEL (Amber)	SOAL (Red)
Dwellings**	Garden used for main amenity (free field) and Outside living or dining or bedroom window (façade)	Day	'Rating level' 10dB* below background	'Rating level' between 9dB below and 5dB above background	'Rating level' greater than 5dB above background
Dwellings**	Outside bedroom window (façade)	Night	'Rating level' 10dB* below background and no events exceeding 57dBL_{Amax}	'Rating level' between 9dB below and 5dB above background or noise events between 57dB and 88dBL_{Amax}	'Rating level' greater than 5dB above background and/or events exceeding 88dBL_{Amax}

**10dB should be increased to 15dB if the noise contains audible tonal elements. (day and night). However, if it can be demonstrated that there is no significant difference in the character of the residual background noise and the specific noise from the proposed development then this reduction may not be required. In addition, a frequency analysis (to include, the use of Noise Rating (NR) curves or other criteria curves) for the assessment of tonal or low frequency noise may be required.*

***levels given are for dwellings, however, levels are use specific and different levels will apply dependent on the use of the premises.*

BS 4142:2014 Methods for rating and assessing industrial and commercial sound

5.15. BS 4142:2014 is intended to be used to assess the likely effects of sound on people residing in nearby dwellings. The scope of BS 4142:2014 includes *"sound from fixed plant installations which comprise mechanical and electrical plant and equipment"*.

5.16. The procedure contained in BS 4142:2014 is to quantify the *"specific sound level"*, which is the measured or predicted level of sound from the source in question over a one-hour period for the daytime and a 15 minute period for the night-time. Daytime is defined in the standard as 07:00 to 23:00 hours, and night-time as 23:00 to 07:00 hours.

5.17. The specific sound level is converted to a rating level by adding penalties on a sliding scale to account for either potentially tonal or impulsive elements. The standard sets out objective

methods for determining the presence of tones or impulsive elements but notes that it is acceptable to subjectively determine these effects.

5.18. The penalty for tonal elements is between 0dB and 6dB, and the standard notes: "Subjectively, this can be converted to a penalty of 2 dB for a tone which is just perceptible at the noise receptor, 4 dB where it is clearly perceptible, and 6 dB where it is highly perceptible."

5.19. The penalty for impulsive elements is between 0dB and 9dB, and the standard notes: "Subjectively, this can be converted to a penalty of 3 dB for impulsivity which is just perceptible at the noise receptor, 6 dB where it is clearly perceptible, and 9 dB where it is highly perceptible."

5.20. The assessment outcome results from a comparison of the rating level with the background sound level. The standard states:

- *Typically, the greater this difference, the greater the magnitude of the impact.*
- *A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context;*
- *A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context;*
- *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.*

5.21. The standard does state that "*adverse impacts include, but are not limited to, annoyance and sleep disturbance. Not all adverse impacts will lead to complaints and not every complaint is proof of an adverse impact.*"

5.22. The standard goes on to note that: *"Where background sound levels and rating levels are low, absolute levels might be as, or more, relevant than the margin by which the rating level exceeds the background. This is especially true at night."*

5.23. In addition to the margin by which the Rating Level of the specific sound source exceeds the Background Sound Level, the 2014 edition places emphasis upon an appreciation of the context, as follows:

"An effective assessment cannot be conducted without an understanding of the reason(s) for the assessment and the context in which the sound occurs/will occur. When making assessments and arriving at decisions, therefore, it is essential to place the sound in context."

5.24. BS 4142:2014 requires uncertainties in the assessment to be considered, and where the uncertainty is likely to affect the outcome of the assessment, steps should be taken to reduce the uncertainty.

Summary of proposed criteria

5.25. Using the methodology in BS 4142:2014 it would be appropriate to assess noise from the plant against the background sound level typical of the period when the plant operates, in this case between 06:30 and 19:30 hours. By extension, London Borough of Camden should accept a plant rating level up to 36 dBA (i.e. 10dBA below the lowest background sound level within that period) as falling within the "green" category within their guidance.

5.26. It is therefore proposed that the rating level of the new plant, at the nearest residential window, does not exceed the limit shown in Table 4.

Table 3 Proposed plant noise emissions level limits at noise sensitive receptors

Receptor	Period	Cumulative plant rating noise level, dB(A)
New residential windows	Plant operating hours (06.30 – 19.30 hours)	36

5.27. This will also result in a plant noise level significantly below the level where a "low impact" would be expected, using the method described in BS 4142:2014.

6.0 Plant noise impact assessment

6.1. The cumulative plant noise level at the most affected noise sensitive receptor has been predicted. The assessment has taken into consideration distance attenuation, acoustic screening and directivity corrections.

6.2. It should be noted that under normal practice the AC units will operate only when the café is open and is not anticipated to exhibit any tonal or impulsive characteristics, provided it is well maintained. All proposed external plant will be inverter driven and, therefore, will gently ramp up and down depending on the demands on the various systems. However, a penalty of 3dB as described in BS 4142:2014 has been applied for the possible presence of "*...characteristics that are neither tonal nor impulsive, though otherwise are readily distinctive against the residual acoustic environment...*".

6.3. Table 3, below, summarises the results of the assessment at the nearest residential windows. All other receptors benefit from increased distance/screening to the plant. The full set of calculations can be found in **Appendix E**. The predictions have been based on the proposed plant operating simultaneously at full capacity.

Table 4 Assessment of predicted noise levels at receptors (R1a, R1b, R2a & R2b)

Receptor	Period	Predicted rating level at receptor L_{Aeq} (dB)	Proposed design criterion (dB)	Difference (dB)
R1a (1st floor Kentish Town Rd)	Plant operating hours (06.30 – 19.30 hours)	27	36	-9
R1b (2nd floor Kentish Town Rd)	Plant operating hours (06.30 – 19.30 hours)	26	36	-10
R2a (1st floor York Mews)	Plant operating hours (06.30 – 19.30 hours)	29	36	-7
R2b (2nd floor York Mews)	Plant operating hours (06.30 – 19.30 hours)	27	36	-9

6.4. It should be noted that the noise predictions are based on the site plans found in **Appendix F**.

6.5. The above assessment, taking into account the AC units being housed within acoustic enclosures (as detailed in section 7.0 below), demonstrates that noise from the proposed plant will be more than 10dBA below the lowest measured background sound level and should therefore be acceptable to London Borough of Camden Council.

Context and uncertainties

6.6. As BS 4142:2014 advises, the estimated impact must be considered within the context of the site and the surrounding acoustic environment. The following must, therefore, also be taken into consideration when determining the potential impact that may be experienced:

- The assessments are undertaken at the nearest residential windows. The impact on all other residential premises will be lower due to distance losses.

6.7. Where possible uncertainty in this assessment has been minimised by taking the following steps:

- The measurement of the background sound levels was undertaken over a period including the quietest times of the day and night.
- The sound level meter and calibrator used have a traceable laboratory calibration and the meter was field calibrated before and after the measurements.
- Uncertainty in the calculated impact has been reduced by the use of a well-established calculation method.

- Care was taken to ensure that the measurement position was representative of the noise climate outside the nearby residential dwellings and not at a position where higher noise levels are present.

7.0 Recommendations

7.1. NSL recommend, in order to meet the noise criteria set by the local authority at 1m from the façade of the nearest noise sensitive receptor, the AC units are housed within acoustic enclosures. The assessment has been based on these providing at least 15dBA attenuation.

7.2. In order that adequate airflow is maintained to the AC units, the screen shown on the architect's drawing in **Appendix F** is considered to be for visual screening only and therefore not provide any appreciable acoustic benefit.

8.0 Summary

8.1. Noise Solutions Ltd (NSL) has been commissioned by Dr. Anish Shah to provide a noise impact assessment of the plant serving Café Nero affecting the proposed new residential development at 335 Kentish Town Road and York Mews, London.

8.2. An environmental noise survey has been undertaken to establish the existing prevailing noise levels at a location representative of the noise climate outside the nearest noise sensitive receptors to the plant area.

8.3. Cumulative noise emissions from the proposed plant have been predicted at the most affected noise sensitive receptors and assessed against typically accepted criteria. Noise from the plant meets the proposed design criteria provided the proposed recommendations have been put into place.

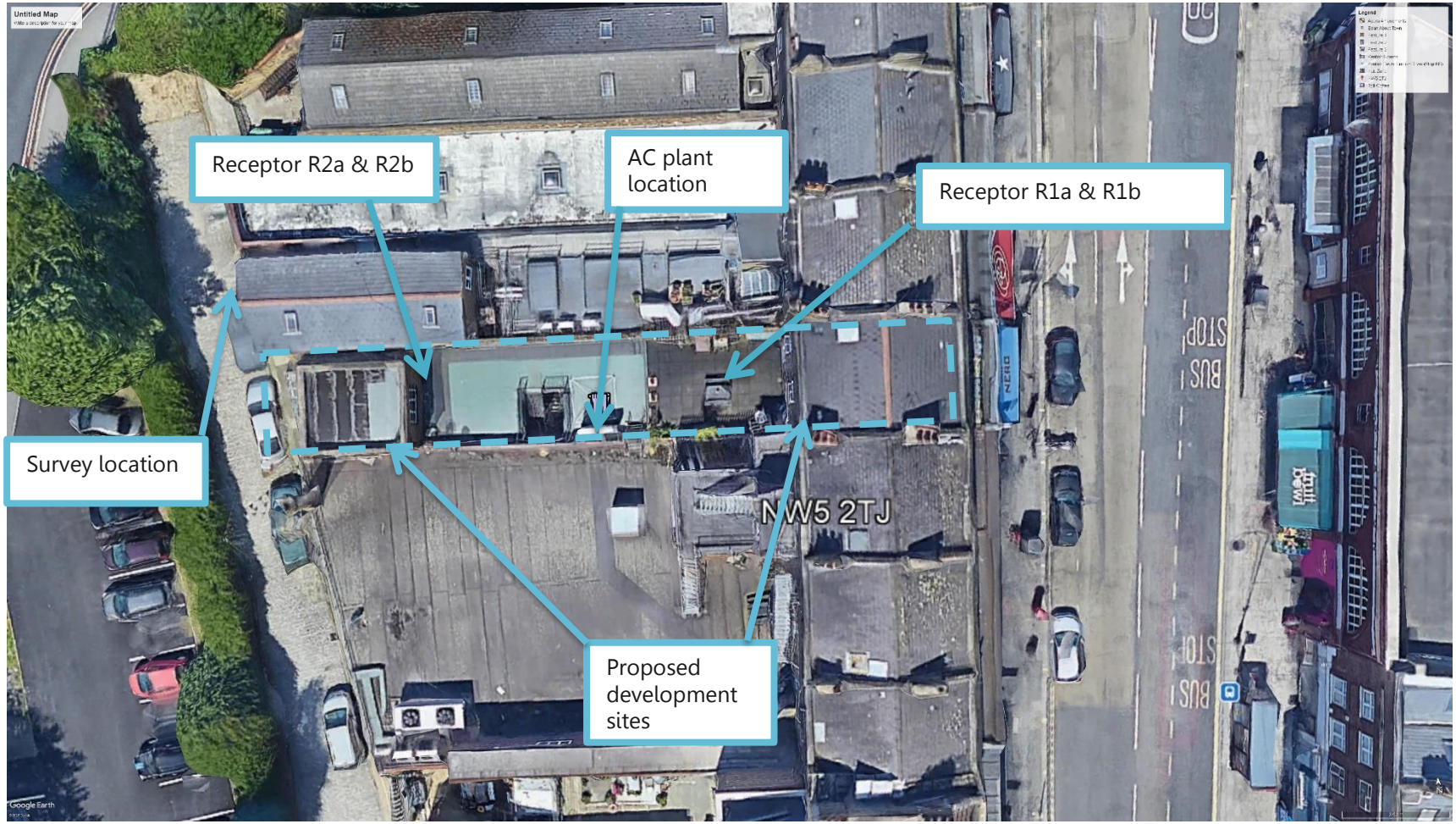
8.4. The assessment has demonstrated compliance with local policies, NPPF and guidance from BS 4142:2014.

8.5. Noise from the AC plant should, when attenuated as described should not, therefore, be a reason for refusal of planning permission for the proposed residential development.

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 Photograph of site showing areas of interest



Appendix C Environmental sound survey

Details of environmental sound surveys

C.1 Measurements of the existing background sound levels were undertaken between 13:00 hours on Tuesday 4th June and 12.30 hours on Wednesday 6th June 2019.

C.2 The sound level meter was programmed to record the A-weighted L_{eq}, L_{90}, L_{10} and L_{max} noise indices for consecutive 15-minute sample periods for the duration of the noise survey.

Measurement position

C.3 The representative measurement position was located on a lamppost on York Mews (location indicated on the site plan in **Appendix B**).

C.4 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 undertaken under free-field conditions.

Equipment

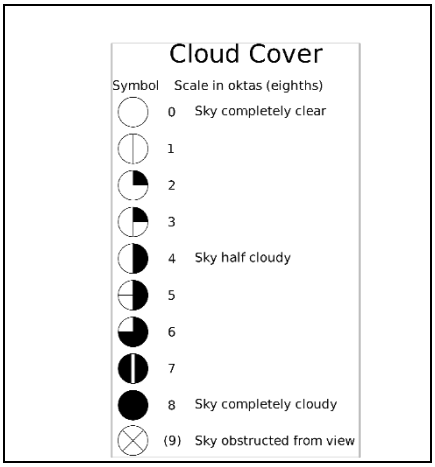
C.5 Details of the equipment used during the survey are provided in the table below. The sound level meter was calibrated before and after the survey; no significant change (+/-0.2 dB) in the calibration level was noted.

Environmental noise survey

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

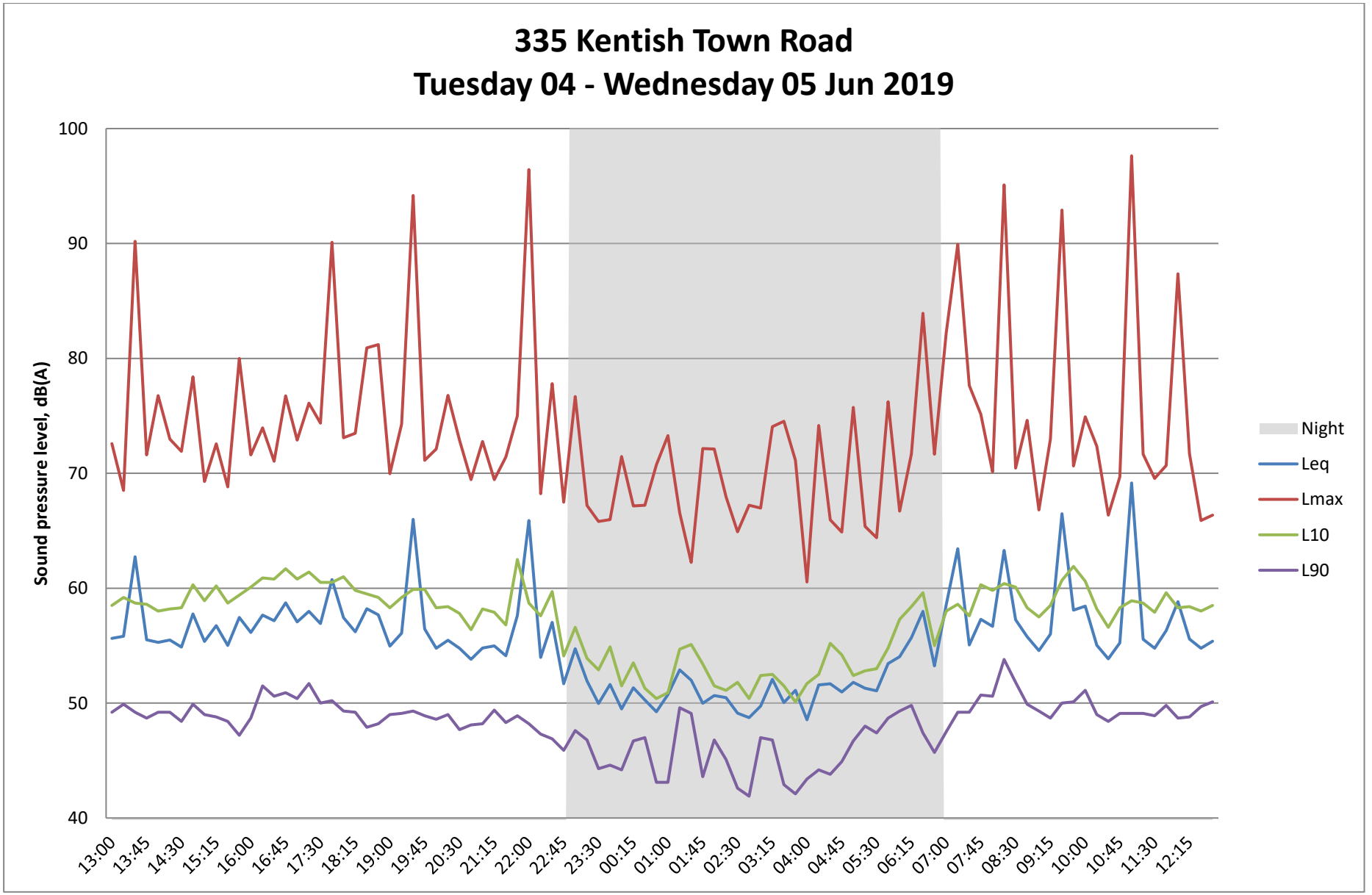
Weather Conditions

C.6 Weather conditions were determined both at the start and on completion of the 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 survey.

Weather Conditions				
Measurement Location	**Date/Time**	**Description**	**Beginning of Survey**	**End of Survey**
As indicated on Appendix B	13:00 5/06/2019-12:30 6/06/2019	Temperature (°C)	17	19
		Precipitation:	Yes	No
		Cloud cover (oktas - see guide)	8	8
		Presence of fog/snow/ice	No	No
		Presence of damp roads/wet ground	Wet	Damp
		Wind Speed (m/s)	0	0
		Wind Direction	-	-
		Conditions that may cause temperature inversion (i.e. calm nights with no cloud)	No	No

Results

C.7 The results of the environmental survey are considered to be representative of the background sound pressure levels at the façades of the nearest noise sensitive receptors during the quietest times at which the plant will operate. The noise climate during the survey period was dominated by local and distant road traffic, local trains and aircrafts. The results of the survey are presented in a time history graph overleaf.


335 Kentish Town Road
Tuesday 04 - Wednesday 05 Jun 2019
Sound pressure level, dB(A)
100
90
80
70
60
50
40
13:00
13:45
14:30
15:15
16:00
16:45
17:30
18:15
19:00
19:45
20:30
21:15
22:00
22:45
23:30
00:15
01:00
01:45
02:30
03:15
04:00
04:45
05:30
06:15
07:00
07:45
08:30
09:15
10:00
10:45
11:30
12:15
Night
Leq
Lmax
L10
L90

Appendix D Manufacturer's plant noise data

Plant item	Make/Model	Quantity	Period	Sound Pressure Level	
				dBA (per unit)	Distance (m)
Air conditioner	Daikin RZQG140L7Y1B	2	Plant operating hours (06.30 – 19.30 hours)	53	1

Appendix E Calculations

Receptor	AC unit	Plant noise level at source		DISTANCE (receptor)		DIRECTIVITY	ENCLOSURE	BS4142 FEATURE	RATING LEVEL AT RECEPTOR (dB)	Cumulative
		Noise level (dBA)	Distance (m)	Distance (m)	Correction (dB)	Correction (dB)	Correction (dB)	Correction (dB)		
R1a	ACU1	53	1	6.4	-16	0	-15	3	25	27
	ACU2	53	1	7.3	-17	0	-15	3	24	
R1b	ACU1	53	1	7.3	-17	0	-15	3	24	26
	ACU2	53	1	8.1	-18	0	-15	3	23	
R2a	ACU1	53	1	6.2	-16	0	-15	3	25	29
	ACU2	53	1	5.4	-15	0	-15	3	26	
R2b	ACU1	53	1	7.3	-17	0	-15	3	24	27
	ACU2	53	1	6.5	-16	0	-15	3	25	

Appendix F Proposed section drawing