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Plant Noise
Impact Assessment

On behalf of

Tyburn
management llp

Project Reference: 87305 | Revision: 00 | Date: 10th May 2018

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Document Information

Project Name	:	**The Co-operative, Haverstock Hill**
Project Reference	:	**87305**
Report Title	:	**Plant Noise Impact Assessment Report**
Doc Reference	:	**87305/NIA**
Date	:	**10th May 2018**

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Revision	Date	Description	Prepared	Reviewed/ Approved

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Executive Summary

The results of the assessment demonstrate that cumulative plant noise emissions from the proposed external plant will comply with the planning condition for this site as long as the proposed brick wall is installed.

Therefore, the local authority should have no grounds to refuse the planning application in relation to fixed plant noise emissions.

As there are residential properties below the plant area, it is recommended that all plant and associated pipework/ductwork should be fitted with suitable anti-vibration mounts.

1.0 Introduction

1.1. Noise Solutions Ltd (NSL) has been commissioned by Tyburn Management LLP to undertake a noise impact assessment for proposed new plant serving a planned Co-operative store located in Unit 1 of the mixed use development at 8 Haverstock Hill, Camden.

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 proposed plant have been predicted at the most affected noise sensitive receptors and assessed using planning Condition 12 for this mixed use development site.

1.4. A glossary of acoustic terminology is given in **Appendix A**.

2.0 Details of development proposals

2.1. The planned Co-operative store is to be located in Unit 1 of the mixed use development site at 8 Haverstock Hill. The Co-operative sales area will be located on the ground floor with the back of house area within the basement below. The upper four floors are to be residential apartments.

2.2. The plant is proposed for the roof of the third floor, adjacent to fourth floor residential flats.

2.3. The proposal is for the installation of two air conditioning (AC) units and a four condenser.

2.4. The proposed refrigeration plant will potentially operate 24 hours a day, although it should be noted that these units operate as required to meet demand and that store demands for cooling are generally reduced at night. The AC units will operate only during store opening hours.

2.5. **Appendix B** contains a table with the manufacturer's published sound pressure levels for the proposed plant.

3.0 Nearest noise sensitive receptors

3.1. The area surrounding the site is mix of commercial and residential in use. The nearest noise sensitive property to the plant area will be the flat located in Unit 19 (Receptor R1) of the development site, with windows approximately 6m away from the nearest plant. This receptor will benefit from line of site protection from the installation of a 1.8m high 100mm deep brick wall in-between the plant area and the windows.

3.2. The hotel at 89 Chalk Farm Road (Receptor R2) is approximately 20m from the plant to south east.

3.3. **Appendix C** contains an aerial photograph showing the site and surrounding area.

4.0 Existing noise climate

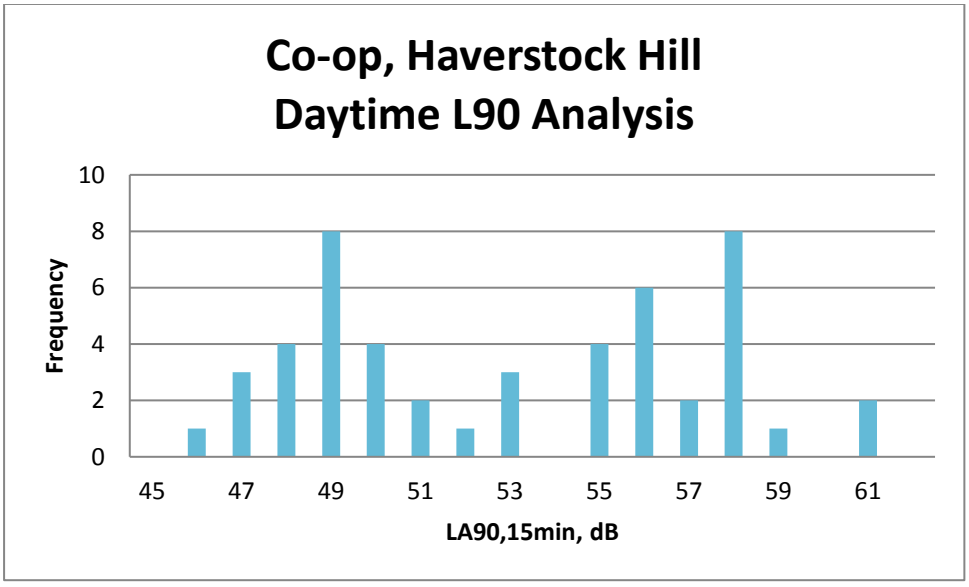
4.1. An environmental noise survey was undertaken to establish the typical background sound levels at a location representative of the noise climate outside the façades of the nearest noise sensitive receptors to the proposed plant area during the quietest times at which the plant will operate.

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 D.**

Table 1 Summary of survey results

Measurement period	Range of recorded sound pressure levels (dB)			
	$L_{Aeq(15mins)}$	$L_{Amax(15mins)}$	$L_{A10(15mins)}$	$L_{A90(15mins)}$
Daytime (07.00 – 23.00 hours)	55-76	68-104	57-78	46-61
Night-time (23.00 – 07.00 hours)	49-63	64-90	52-61	40-52

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



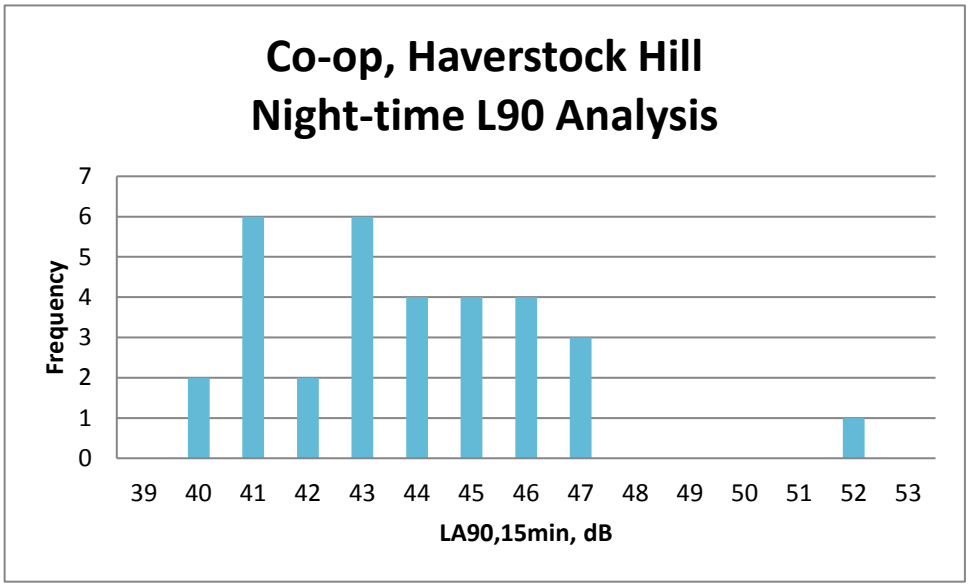
4.3. Additional statistical analysis has been undertaken. As shown in Table 2, the mean, median, and modal values have been calculated:

Table 2 Statistical analysis of $L_{A90,15min}$ levels during the daytime period

dB, L_{A90} daytime period	
Mean	53
Median	53
Mode	58

4.4. The mean, median and modal values range between 53 and 58dB L_{A90}. As shown in Figure 1, the background sound level only rarely falls below 49dB L_{A90}, so this has been considered as representative of the typical background sound level during the daytime period at Crogsland Road.

Figure 2 Histogram of night-time L_{A90} background sound pressure levels



4.5. As can be seen in Figure 2, the night-time background sound level is only rarely below 41dB L_{A90}, so this is considered as representative of the typical background sound level during the night-time period at Crogsland Road.

4.6. Therefore, the following values are considered as representative of the existing background sound pressure levels at nearby noise sensitive premises:

- 49dB L_{90} during the daytime period; and
- 41dB L_{90} during the night-time period

5.0 Plant noise design criteria

London Borough of Camden

5.1. The planning application (reference: 2015/0487/P) for this mixed use development site has been approved with conditions by the London Borough of Camden. Condition 12 relates to plant noise and states:

> *"Noise levels at a point 1 metre external to sensitive facades shall be at least 5dB(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 10dB(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 policy CS5 of the London Borough of Camden Local Development Framework Core Strategy and policies DP26 and DP28 of the London Borough of Camden Local Development Framework Development Policies."*

National Planning Policy Framework

5.2. The *National Planning Policy Framework (NPPF)* was introduced in March 2012. The document sets out the Government's planning policies for England and how these are expected to be applied.

5.3. Paragraph 123 of the *NPPF* states that planning policies and decisions should aim to:

- *avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of new development;*
- *mitigate and reduce to a minimum other adverse impacts on quality of life arising from noise from new development, including through the use of conditions;*
- *recognise that development will often create some noise and existing businesses wanting to develop in continuance of their business should not have unreasonable restrictions put on them because of changes in nearby land uses since they were established [subject to the provisions of the Environmental Protection Act 1990 and other relevant law]; and*

- *identify and protect areas of tranquillity which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.*

5.4. Furthermore the NPPF gives weight to the requirements of the local authority as it states the following:

> *11. Planning law requires that applications for planning permission must be determined in accordance with the development plan unless material considerations indicate otherwise.*
>
> *12. This National Planning Policy Framework does not change the statutory status of the development plan as the starting point for decision making. Proposed development that accords with an up-to-date Local Plan should be approved, and proposed development that conflicts should be refused unless other material considerations indicate otherwise. It is highly desirable that local planning authorities should have an up-to-date plan in place.*
>
> *13. The National Planning Policy Framework constitutes guidance for local planning authorities and decision-takers both in drawing up plans and as a material consideration in determining applications.*

Proposed criteria

5.5. The plant is not expected to exhibit any of the acoustic features described in Condition 12 of the planning application, therefore noise emissions from the plant should be controlled to a level at least 5dB(A) below the representative L_{A90} background sound level.

5.6. Table 3 below presents the proposed plant noise level limits at the nearest receptors.

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

Period	Cumulative plant noise level, dB(A)
Daytime (07.00 – 23.00 hours)	44
Night-time (23.00 – 07.00 hours)	36

6.0 Plant noise assessment

6.1. The cumulative plant noise level at the most affected noise sensitive receptors has been predicted. The assessment has taken into consideration distance attenuation, directivity corrections and the 1.8m high brick wall between the plant and receptor R1.

6.2. The predictions during the daytime period have been based on the proposed AC and refrigeration plant operating at full capacity. During the night-time period only the refrigeration plant is to be operating.

6.3. Table 4, below, summarises the results of the assessment at 1 metre from the nearest noise-sensitive windows. All other nearby receptors benefit from increased distance/screening to the plant. The full set of calculations can be found in **Appendix E.**

Table 4 Assessment of predicted noise levels at nearby receptors

Receptor	Period	Predicted plant noise level at receptor, L_{Aeq} (dB)	Proposed design criterion (dB)	Difference (dB)
R1	Daytime (07.00 – 23.00 hours)	43	44	-1
	Night-time (23:00 – 07:00 hours)	22	36	-14
R2	Daytime (07.00 – 23.00 hours)	38	44	-6
	Night-time (23:00 – 07:00 hours)	17	36	-19

6.4. The above assessment demonstrates that noise from the proposed plant will comply with Condition 12 of the planning application (reference: 2015/0487/P) during both the daytime and night-time periods.

6.5. As there are residential properties below the plant area, it is recommended that all plant and associated pipework/ductwork should be fitted with suitable anti-vibration mounts.

7.0 Summary

7.1. Noise Solutions Ltd (NSL) has been commissioned by Tyburn Management LLP to undertake a noise impact assessment for proposed external plant serving the proposed Co-operative store located in Unit 1 of the mixed use development at 8 Haverstock Hill, Camden.

7.2. 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 proposed plant area.

7.3. An assessment has demonstrated that noise from proposed plant will meet planning Condition 12's noise requirements during both the daytime and night-time periods, with the installation of a brick wall between the plant and receptor R1.

7.4. The results of this assessment demonstrate that noise emissions from proposed plant should be considered acceptable to the London Borough of Camden. Noise from proposed fixed plant should not be grounds for refusal of planning permission.

Appendix A Acoustic terminology

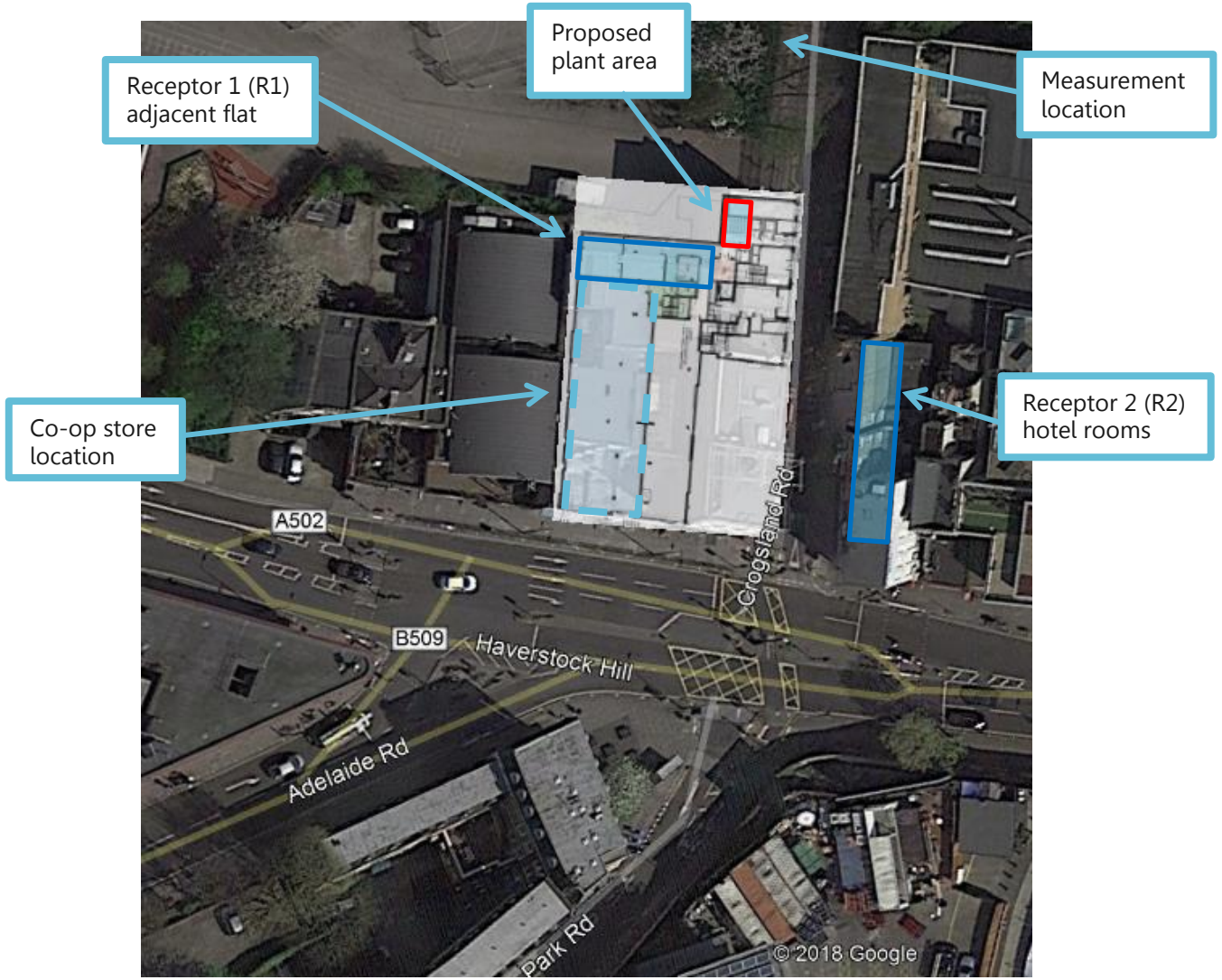
Parameter	Description
Ambient Noise Level	The totally encompassing sound in a given situation at a given time, usually composed of a sound from many sources both distant and near ($L_{Aeq,T}$).
Decibel (dB)	A scale for comparing the ratios of two quantities, including sound pressure and sound power. 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 Plant information and manufacturer published sound pressure levels

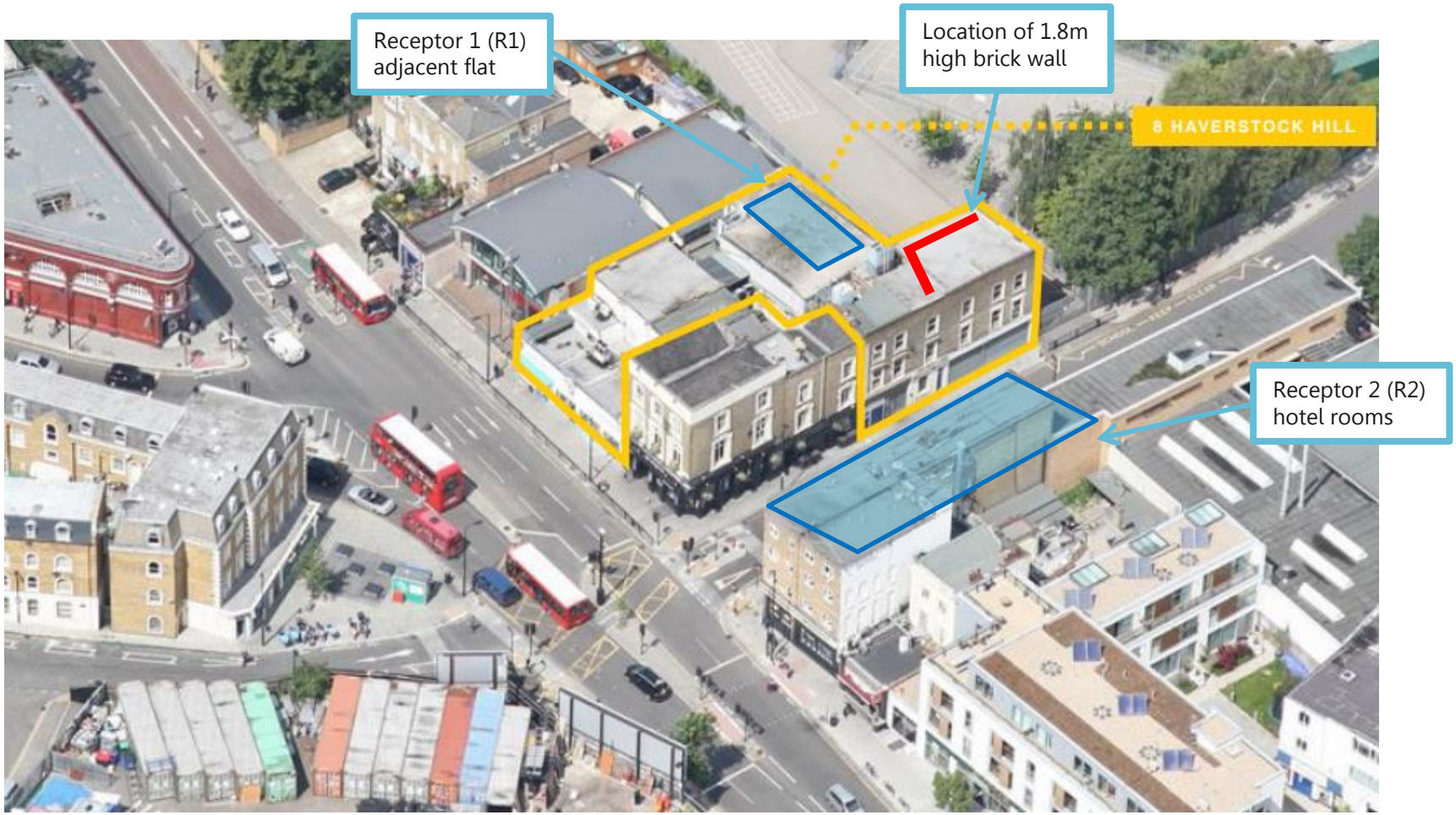
Plant item	Make/Model	Quantity	Period	Sound Pressure Level	
				dBA	Distance (m)
Air Conditioner	Mitsubishi / PUMY-P200YKM(-BS)	2	Daytime period (07:00 – 23:00 hours)	61	1
			Night-time period (23:00 – 07:00 hours)	-	-
Condenser	Kelvion / RF-PB202L3H-091M340	1	Daytime period (07:00 – 23:00 hours)	30	10
			Night-time period (23:00 – 07:00 hours)	23	10

Note 1: The AC unit will be switched off during the night-time period.

Appendix C Photograph of site showing areas of interest



Photograph 1 Courtesy of Google Earth


Receptor 1 (R1)
adjacent flat
Location of 1.8m
high brick wall
8 HAVERSTOCK HILL
Receptor 2 (R2)
hotel rooms

Appendix D Environmental sound survey

Details of environmental sound surveys

D.1 Measurements of the existing background sound levels were undertaken from 15.00 hours on Wednesday 10th January to 11.00 hours on Thursday 11th January 2018.

D.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 fifteen-minute sample periods for the duration of the survey.

Measurement position

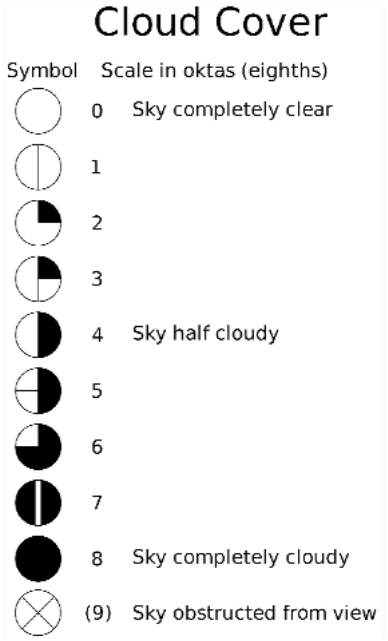
D.3 The sound level meter was positioned on a lamppost along Crogsland Road. The approximate location of the microphone is indicated on the aerial photograph in Appendix B.

Equipment

D.4 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.

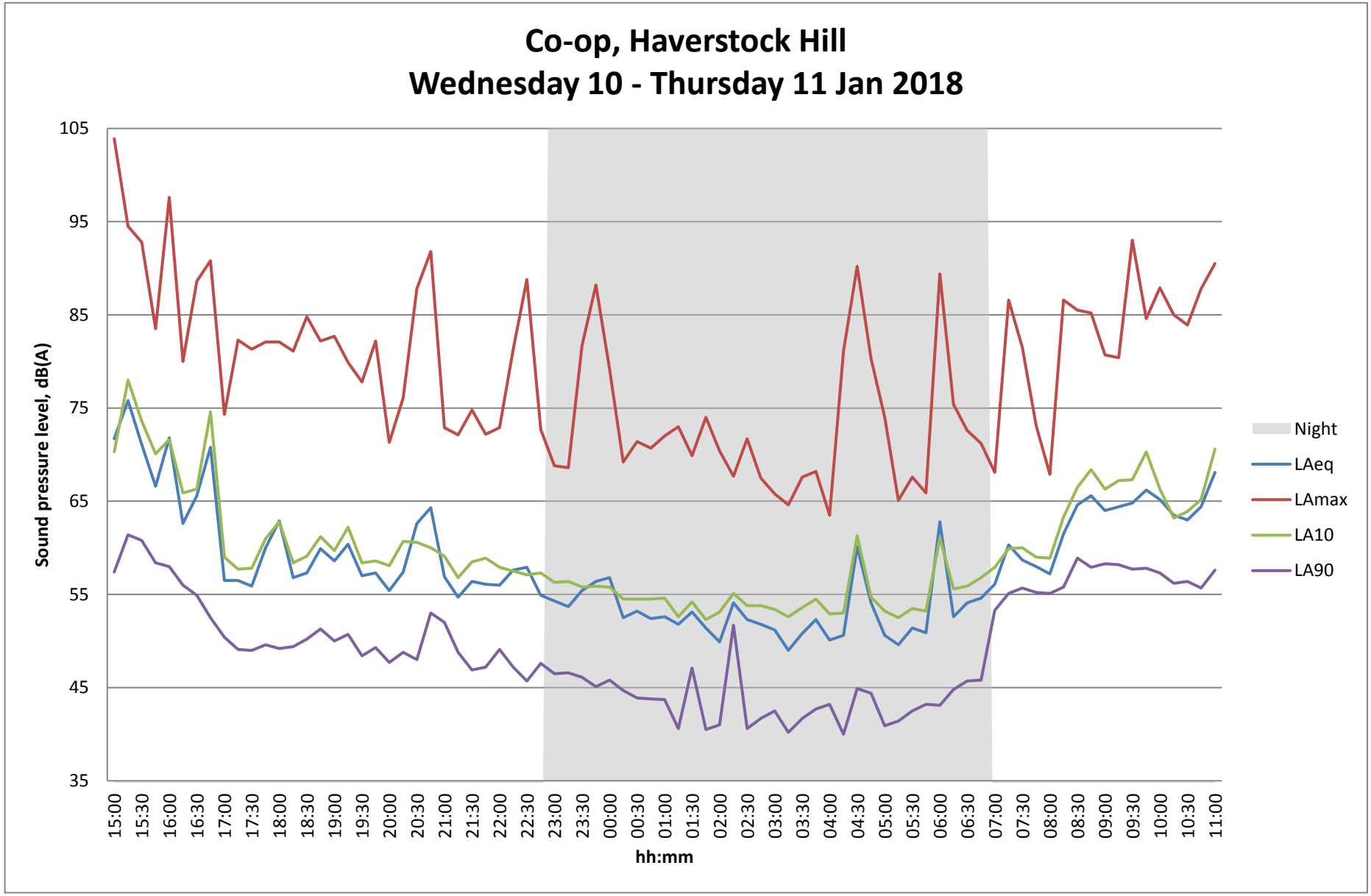
Description	Model / serial no.	Calibration date	Calibration certificate no.
Class 1 Sound level meter	Svantek 949 / 8195	24/10/2016	1610560
Condenser microphone	MCE212/ 22267		
Preamplifier	Svantek SV12L / 7557		
Calibrator	Svantek SV 40A / 10843	06/10/2016	1610518

D.5 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	**Time/Date**	**Description**	**Beginning of Survey**	**End of Survey**
As indicated on Appendix B	15.00 10/01/2018 - 11.00 11/01/2018	Temperature (°C)	10	7
		Precipitation:	No	No
		Cloud cover (oktas – see guide)	5	8
		Presence of fog/snow/ice	No	No
		Presence of damp roads/wet ground	No	Damp
		Wind Speed (m/s)	3	3
		Wind Direction	S	S
		Conditions that may cause temperature inversion (i.e. calm nights with no cloud)	No	No

Results

7.5. The results of the survey are considered to be representative of the background sound pressure levels at the façades of the most affected noise sensitive receptors to the plant area during the quietest times at which the plant will operate. The noise climate at the measurement position was dominated by local road traffic, nearby plant along with children in the playground and construction noise. The results of the survey are presented in a time history graph overleaf.


Co-op, Haverstock Hill
Wednesday 10 - Thursday 11 Jan 2018
Sound pressure level, dB(A)
105
95
85
75
65
55
45
35
15:00
15:30
16:00
16:30
17:00
17:30
18:00
18:30
19:00
19:30
20:00
20:30
21:00
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05:30
06:00
06:30
07:00
07:30
08:00
08:30
09:00
09:30
10:00
10:30
11:00
hh:mm
Night
LAeq
LAmax
LA10
LA90

Appendix E Noise level predictions

Plant item	Manufacturer noise data		Distance correction		Directivity correction (dB)	Screening correction (dB)	Resultant at receptor, L_{Aeq} (dB)
	Noise level, L_{Aeq} (dB)	Distance (m)	Distance (m)	Correction (dB)			
AC	61	1	8	-18	3	-5	41
AC	61	1	8	-18	0	-5	38
Condenser	30	10	6	4	0	-5	29
					Cumulative (dB)		43

Receptor R1, Night-time period

Plant item	Manufacturer noise data		Distance correction		Directivity correction (dB)	Screening correction (dB)	Resultant at receptor, L_{Aeq} (dB)
	Noise level, L_{Aeq} (dB)	Distance (m)	Distance (m)	Correction (dB)			
Condenser	23	10	6	4	0	-5	22
					Cumulative (dB)		22

Receptor R2, Day-time period

Plant item	Manufacturer noise data		Distance correction		Directivity correction (dB)	Screening correction (dB)	Resultant at receptor, L_{Aeq} (dB)
	Noise level, L_{Aeq} (dB)	Distance (m)	Distance (m)	Correction (dB)			
AC	61	1	20	-26	0	0	35
AC	61	1	20	-26	0	0	35
Condenser	30	10	20	-6	0	0	24
					Cumulative (dB)		38

Receptor R2, Night-time period

Plant item	Manufacturer noise data		Distance correction		Directivity correction (dB)	Screening correction (dB)	Resultant at receptor, L_{Aeq} (dB)
	Noise level, L_{Aeq} (dB)	Distance (m)	Distance (m)	Correction (dB)			
Condenser	23	10	20	-6	0	0	17
					Cumulative (dB)		17