HONEST BURGERS

117 TOTTENHAM COURT ROAD
LONDON W1T 5AL

NOISE ASSESSMENT

MAY 2016

KC environmental ltd

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Project: 1286	May 2016
Prepared & Checked By:	Ken Collins

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PREFACE

This report has been prepared by Ken Collins, a Director of KC Environmental Ltd. Prior to forming KC Environmental, Ken has been a Director of Addiscombe Environmental Ltd, of RPS Planning Transport and Environment, and of Ashdown Environmental Limited. He is a Member of the Institute of Acoustics and a Member of the Institute of Environmental Sciences. He has nearly 45 years project and research experience in acoustics, covering transport, industrial, commercial and residential developments, recreation, and building acoustics.

Since 1994 he has been the representative of the Institute of Acoustics on the BSi Committee EH/1/3 "Industrial and Residential Noise" which, among other things, deals with BS 4142 "Methods for rating and assessing industrial and commercial sound". He was a member of the drafting committees that were responsible for the revisions to BS 4142 published in 1997 and 2014. He was a committee member of the Environmental Noise Group of the Institute of Acoustics from its inception in 1994 until 2011 (immediate past Chair).

Prior to forming Ashdown Environmental Limited, he worked for Travers Morgan from 1978 until 1988. His experience with them was primarily the assessment of environmental impacts of various transportation and industrial schemes, although he also undertook work on a number of other acoustic issues, unrelated to transport or industry.

Before his employment with Travers Morgan, he was employed in the Acoustics Unit of the National Physical Laboratory for eight years, where he was engaged in research into the prediction of transportation noise and also responsible for the calibration of microphones used as National Standards.

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1. INTRODUCTION

1.1 Honest Burgers is proposing to operate a restaurant at 117 Tottenham Court Road, London W1T 5AL, and a planning application is being submitted to Camden Council.

1.2 As part of the planning application for the restaurant, it is proposed to install a kitchen extract fan, two air supply fans and two condensers on the flat rear roof at first floor level. There would also a small extract fan located inside the building, venting through the flat rear roof of the unit into the plant area.

1.3 Stone Blue Projects has commissioned KC Environmental Limited (KCEL) to undertake a noise assessment to accompany a planning application.

1.4 A noise assessment has been undertaken, including site visits and ambient noise monitoring, and a comparison of the predicted noise levels from the new plant has been made with the Camden Council's noise criterion.

2. NOISE UNITS AND STANDARDS

Noise Units

2.1 Noise is defined as unwanted sound. The range of audible sound is from 0 dB to 140 dB. The frequency response of the ear is usually taken to be about 18 Hz (number of oscillations per second) to 18000 Hz. The ear does not respond equally to different frequencies at the same level. It is more sensitive in the mid-frequency range than the lower and higher frequencies and because of this, the low and high frequency components of a sound are reduced in importance by applying a weighting (filtering) circuit to the noise measuring instrument. The weighting which is most widely used and which correlates best with subjective response to noise is the dB(A) weighting. This is an internationally accepted standard for noise measurements.

2.2 The "loudness" of a noise is a subjective parameter, but it is generally accepted that an increase/decrease of 10 dB(A) corresponds to a doubling/halving in perceived loudness.

2.3 External noise levels are rarely steady, but rise and fall according to activities within an area. In an attempt to produce a figure that relates this variable noise level to subjective response, a number of noise indices have been developed. These include:

i) The L_{Amax} noise level

This is the maximum noise level recorded over the measurement period.

ii) The L_{Aeq} noise level

This is the "equivalent continuous A-weighted sound pressure level, in decibels", and is defined in British Standard BS 7445 [1] as the "value of the A-weighted sound pressure level of a continuous, steady sound that, within a specified time interval, T, has the same mean square sound pressure as a sound under consideration whose level varies with time".

It is a unit commonly used to describe construction noise and noise from industrial premises and is the most suitable unit for the description of other forms of environmental noise. In more straightforward terms, it is a measure of energy within the varying noise.

iii) The L_{A10} noise level

This is the noise level that is exceeded for 10% of the measurement period and gives an indication of the noisier levels. It is a unit that has been used over many years for the measurement and assessment of road traffic noise.

iv) The L_{A90} noise level

This is the noise level that is exceeded for 90% of the measurement period and gives an indication of the noise level during quieter periods. It is often referred to as the background noise level and is used in the assessment of disturbance from industrial noise.

Camden Council

2.4 Camden Council has a noise and vibration policy in their Development Policy, 2010 - 2025. Policy DP28 states:

"Policy DP28 - Noise and vibration

The Council will seek to ensure that noise and vibration is controlled and managed and will not grant planning permission for:
a) development likely to generate noise pollution; or
b) development sensitive to noise in locations with noise pollution, unless appropriate attenuation measures are provided.
Development that exceeds Camden's Noise and Vibration Thresholds will not be permitted.

The Council will only grant permission for plant or machinery if it can be operated without cause harm to amenity and does not exceed our noise thresholds.

The Council will seek to minimise the impact on local amenity from the demolition and construction phases of development. Where these phases are likely to cause harm, conditions and planning obligations may be used to minimise the impact."

2.5 The text accompanying the policy states:

28.1 Noise and vibration can have a major effect on amenity and health and therefore quality of life. Camden's high density and mixed-use nature means that disturbance from noise and vibration is a particularly important issue in the borough. Camden's Core Strategy recognises the importance of this issue for Camden's residents and policy DP28 contributes to implementing a number of Core Strategy policies, including CS5 - Managing the impact of growth and development, CS9 - Achieving a successful Central London, CS11 - Promoting sustainable and efficient travel and CS16 – Improving Camden's health and well-being.

28.2 The effect of noise and vibration can be minimised by separating uses sensitive to noise from development that generates noise and by taking measures to reduce any impact. Noise sensitive development includes housing, schools and hospitals as well as offices, workshops and open spaces, while noise is generated by rail, road and air traffic, industry, entertainment (e.g. nightclubs, restaurants and bars) and other uses.

28.3 The Council will only grant planning permission for development sensitive to noise in locations that experience noise pollution, and for development likely to generate noise pollution, if appropriate attenuation measures are taken, such as double-glazing. Planning permission will not be granted for development sensitive to noise in locations that have unacceptable levels of noise. Where uses sensitive to noise are proposed close to an existing source of noise or when development that generates noise is proposed, the Council will require an acoustic report to ensure compliance with PPG24: Planning and noise. A condition will be imposed to require that the plant and equipment which may be a source of noise pollution is kept working efficiently and within the required noise limits and time restrictions. Conditions may also be imposed to ensure that attenuation measures are kept in place and effective throughout the life of the development.

28.4 In assessing applications, we will have regard to the Noise and Vibration Thresholds, set out below. These represent an interpretation of the standards in PPG24 and include an evening period in addition to the day and night standards

contained in the PPG, which provide a greater degree of control over noise and vibration during a period when noise is often an issue in the borough.

Table A: Noise levels on residential sites adjoining railways and roads at which planning permission will not be granted

Noise description and location of measurement	Period	Time	Sites adjoining railways	Sites adjoining roads
Noise at 1 metre external to a sensitive façade	Day	0700-1900	74 dB $L_{Aeq,}$12h	72 dB $L_{Aeq,}$12h
Noise at 1 metre external to a sensitive façade	Evening	1900-2300	74 dB $L_{Aeq,}$4h	72 dB $L_{Aeq,}$4h
Noise at 1 metre external to a sensitive façade	Night	2300-0700	66 dB $L_{Aeq,}$8h	66 dB $L_{Aeq,}$8h

Table B: Noise levels on residential streets adjoining railways and roads at and above which attenuation measures will be required

Noise description and location of measurement	Period	Time	Sites adjoining railways	Sites adjoining roads
Noise at 1 metre external to a sensitive façade	Day	0700-1900	65 dB $L_{Aeq,}$12h	62 dB $L_{Aeq,}$12h
Noise at 1 metre external to a sensitive façade	Evening	1900-2300	60 dB $L_{Aeq,}$4h	57 dB $L_{Aeq,}$4h
Noise at 1 metre external to a sensitive façade	Night	2300-0700	55 dB $L_{Aeq,}$1h	52 dB $L_{Aeq,}$1h
Individual noise events several times an hour	Night	2300-0700	>82dB L_{Amax} (S time weighting)	>82dB L_{Amax} (S time weighting)

Table C: Vibration levels on residential sites adjoining railways and roads at which planning permission will not be granted

Vibration description and location of measurement	Period	Time	Vibration levels
Vibration inside critical areas such as a hospital operating theatre	Day, evening and night	0000-2400	0.1 VDV ms-1.75
Vibration inside dwellings	Day and evening	0700-2300	0.2 to 0.4 VDV ms-1.75
Vibration inside dwellings	Night	2300-0700	0.13 VDV ms-1.75
Vibration inside offices	Day, evening and night	0000-2400	0.4 VDV ms-1.75
Vibration inside workshops	Day, evening and night	0000-2400	0.8 VDV ms-1.75
Where dwellings may be affected by ground-borne regenerated noise internally from, for example, railways or underground trains within tunnels, noise levels within the rooms should not be greater than 35dB(A)max			

Table D: Noise levels from places of entertainment on adjoining residential sites at which planning permission will not be granted

Noise description and measurement location	***Period***	***Time***	***Sites adjoining places of entertainment***
Noise at 1 metre external to a sensitive façade	*Day and evening*	*0700-2300*	*L_{Aeq}, 5m shall not increase by more than 5dB**
Noise at 1 metre external to a sensitive façade	*Night*	*2300-0700*	*L_{Aeq}, 5m shall not increase by more than 3dB**
Noise inside any living room of any noise sensitive premises, with the windows open or closed	*Night*	*2300-0700*	*L_{Aeq}, 5m (in the 63Hz Octave band measured using the 'fast' time constant) should show no increase in dB**
** As compared to the same measure, from the same position, and over a comparable period, with no entertainment taking place*			

Table E: Noise levels from plant and machinery at which planning permission will not be granted

Noise description and location of measurement	***Period***	***Time***	***Noise level***
Noise at 1 metre external to a sensitive façade	*Day, evening and night*	*0000-2400*	*5dB(A) <LA90*
Noise that has a distinguishable discrete continuous note (whine, hiss, screech, hum) at 1 metre external to a sensitive façade.	*Day, evening and night*	*0000-2400*	*10dB(A) <LA90*
Noise that has distinct impulses (bangs, clicks, clatters, thumps) at 1 metre external to a sensitive façade.	*Day, evening and night*	*0000-2400*	*10dB(A) <LA90*
Noise at 1 metre external to sensitive façade where LA90>60dB	*Day, evening and night*	*0000-2400*	*55dB$_{LAeq}$*

Key references / evidence

- *Camden's Noise Strategy, 2002*
- *The London Plan (Consolidated with Alterations since 2004), 2008*
- *Planning Policy Guidance 24: Planning and noise*

2.6 The relevant criterion in this case is therefore that contained in Table E, above.

3. NOISE MEASUREMENTS

3.1 Unattended noise monitoring was undertaken between 16:00 hours on Monday 7th March 2016 and 11:30 hours on Tuesday 8th March 2016.

3.2 Measurements were undertaken on the flat rear roof of the building at first floor level at a height of 1.5 metres. Measurement periods of fifteen minutes were recorded for the duration of the survey.

3.3 A CEL 480 class 1 logging sound level meter was used for the noise survey. Before and after the survey period, the sound level meter was calibrated using a CEL 284 class 1L acoustic calibrator. No drift was noted. The manufacturer had calibrated the sound level meter on 28th July 2014 and the calibrator on 28th October 2015.

3.4 The calibration certificates of the instruments are shown in Appendix A.

3.5 During the survey, the L_{Aeq} and L_{A90} noise levels were measured, together with the L_{Amax} and L_{A10} levels.

3.6 During the survey, the weather was dry and calm and the meteorological conditions were suitable for noise measurements. The weather was measured on site using a Kestrel 4000NV weather meter. The wind speed was less than 0.1 ms^{-1} at 16:00 hours, and 11:00 hours, and the temperature and relative humidity were 6º C and 56%, and 6º C and 60% at the same times. There was no rain, and the ground surfaces were dry. A local weather site was checked, and there was no particular variation in conditions over the duration of the survey.

3.7 The full results of the survey are given in Appendix B of this report, but a summary of the results for the relevant periods is given in Table 3.1 below.

Table 3.1: Summary of Results of Noise Measurements

	Average L_{A90} (dB)	**Minimum L_{A90} (dB)**	**L_{Aeq} (dB)**	**L_{Amax} (dB)**
Daytime (07:00-23:00)	56.4	52.1	66.4	64.6 – 93.4
Night (23:00-07:00)	50.4	47.9	63.7	64.1 – 85.5

3.8 It is considered that 52 dB is representative of the lowest existing L_{A90} background noise when the plant could be operating, i.e. the opening hours, and has been used for that purpose in the assessment.

3.9 Measurements of similar plant have been undertaken at various other restaurants over a number of years. When those measurements were undertaken, they were not affected by any external noise, and were in locations similar to the Tottenham Court Road site, with hard, reflective surfaces around.

4 NOISE ASSESSMENT

4.1 The site is located on the western side of Tottenham Court Road, close to the junction with Grafton Way.

4.2 External plant will be located on the flat rear roof of the building, at first floor level.

4.3 It is proposed to install a kitchen extract fan, two air supply fans and two condensers on the flat rear roof at first floor level. There would also a small extract fan located inside the building, venting through the flat rear roof of the unit into the plant area.

4.4 In order to minimise noise impact on the adjacent properties, all of the external fans would be fitted with attenuators. In addition, the condensers would be located in a housing fitted with acoustic louvres.

4.5 From examination of the surrounding buildings, it has been determined that the upper floors of all of the buildings in the block are residential. All other residential property is more distant or more screened, and will therefore receive lower noise levels.

4.6 Camden Council requires that noise from the proposed plant will be 5 dB lower than the existing L_{A90} background noise level, when measured 1 m from the nearest sensitive facade if the noise has no distinguishable discrete continuous tone or impulse, and 10 dB lower than the existing L_{A90} background noise level if there are distinguishable tones or impulses.

4.7 It is possible that the all plant could operate together during the opening time of the restaurant, i.e. between 11:30 and 23:00 hours. The lowest measured background noise level during the opening hours was 52 dB, and this has been used in the assessment.

4.8 Based on the plant data and measurements of similar plant in similar situations, it is considered that noise from the proposed plant does not contain any discrete tones or impulsive characteristics, and therefore the criteria would be 5 dB less than the background noise level of 52 dB, i.e. 47 dB or less.

4.9 Calculations have been undertaken based on the plant data. The results of the calculations are shown in Appendix C.

4.10 The measurements of both the ambient noise and the proposed plant were taken under repeatable conditions, and the uncertainty in the result will be low.

4.11 It has been calculated that the total noise level from the proposed plant would be 40 dB(A) at 1m from the nearest windows in the flats in the upper storeys of the properties on Tottenham Court Road. This is 12 dB(A) below the lowest measured background noise level of 52 dB(A).

4.12 This level would therefore comply with the requirements of Table E of Policy DP28 in Camden Council's Development Policy, 2010 - 2025.

4.13 It has been calculated that the total noise level from the proposed plant would be 45dB(A) at 1m from the nearest windows in the flats in the upper storeys of the properties on Grafton Way. This is 7 dB(A) below the lowest measured background noise level of 52 dB(A).

4.14 This level would therefore comply with This level would therefore comply with the requirements of Table E of Policy DP28 in Camden Council's Development Policy, 2010 - 2025.

4.15 All other residential windows are further away and/or more screened from the plant, and would therefore receive lower noise levels.

4.16 It is therefore considered that the relevant criteria in Policy DP28 in Camden Council's Development Policy, 2010 - 2025 would be complied with, and that there would be no loss of amenity to nearby residents.

5 CONCLUSIONS

5.1 Honest Burgers is proposing to operate a restaurant at 117 Tottenham Court Road, London W1T 5AL, and a planning application is being submitted to Camden Council. As part of the planning application for the restaurant, it is proposed to install a kitchen extract fan, two air supply fans and two condensers on the flat rear roof at first floor level. There would also a small extract fan located inside the building, venting through the flat rear roof of the unit into the plant area.

5.2 A noise assessment of the plant has been undertaken, and the noise level due to the proposed plant has been calculated.

5.3 It has been calculated that the noise from the plant would meet the criteria Policy DP28 in Camden Council's Development Policy, 2010 - 2025, and would not cause any disturbance or loss of amenity to occupiers of any neighbouring properties.

5.4 It is considered that there is therefore no reason why planning permission should not be granted on acoustic grounds.

REFERENCES

1. British Standards Institution. British Standard 7445: Description and Measurement of Environmental Noise, Part 1. Guide to Quantities and Procedures, 1991.

APPENDIX A

Calibration Certificates

Certificate of Conformity and Calibration

CASELLA CEL

Customer	**KC Environmental Ltd**	**Log Number**	12140

Meter		**Pre-amp**	
Manufacturer	**Casella**	Manufacturer	**Casella**
Model Number	**480.C1**	Model Number	**495**
Serial Number	**032775**	Serial Number	**032776**
Firmware Revision	**2.01**		
Performance Class	**1**		

Microphone		**Calibrator**	
Manufacturer	**Casella**	Manufacturer	**Casella**
Model Number	**250**	Model Number	**284/2**
Serial Number	**4255**	Serial Number	**4/12023510**
		T/E Number	N/A
Accessories	None		

Certificate Number **12140**

Applicable Sound Level Meter Standards	IEC 60651 1994	IEC 60804 2000

Test Procedure	Cal 101

Test Conditions

Temperature	**27.0**	°C		
Humidity	**40.0**	%RH		
Ambient Pressure	**1012.0**	mBar	101.2	kPa

Test Engineer **Mike Hill**

Date of Test **28-Jul-14** Date of last Calibration **Unknown**

This test certificate confirms that the instrument specified above has been successfully tested to comply with the manufacturer's published specifications.
Tests are performed using equipment traceable to national standards in accordance with Casella's ISO 9000:2008 quality procedures.
The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a level of confidence of approximately 95%.

Test Summary

Linearity	**PASS**
Frequency Weightings	**PASS**
F and S Time Weightings	**PASS**
Time Weighting Impulse	**PASS**
RMS Detector Accuracy	**PASS**
Overload Indication	**PASS**
Time Averaging	**PASS**
Pulse Range	**PASS**
Sound Exposure Level	**PASS**
Peak Response	**PASS**
Acoustic Frequency Response	**PASS**

CASELLA CEL

Certificate of Conformity and Calibration

Customer:	KC Environmental Ltd
Instrument:	CEL-284/2
Serial Number:	4/12023510
Job Number:	13907
Date of Issue:	29-Oct-2015
Engineer:	M Hill

Traceable Equipment:

Reference Calibrator	EQ11084
DVM type Fluke 45	EQ00318

Test Conditions:

Ambient Temperature	23.0	°C
Ambient Humidity	51.0	%RH
Ambient Pressure	1007	mBar

Results:

	Level 1		Level 2		Frequency	
Initial Reading	115.00	dB	99.90	mV	1.0007	kHz
Final Reading	113.96	dB	99.90	mV	1.0006	kHz

Uncertainty:

Level	±	0.15	dB
Frequency	±	0.5	Hz

This test certificate confirms that the instrument specified above has been successfully tested to comply with the manufacturer's published specifications.
Tests are performed using equipment traceable to national standards in accordance with Casella's ISO 9000:2008 quality procedures.
The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a level of confidence of approximately 95%.

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APPENDIX B

Results of Noise Survey

Date	Time	L_{Aeq} dB	L_{Amax} dB	L_{A10} dB	L_{A90} dB
07/03/16	16:00	66.8	80.2	63.8	57.2
07/03/16	16:15	66.3	74.4	63.3	57.5
07/03/16	16:30	67.0	81.2	63.4	57.0
07/03/16	16:45	66.6	78.9	63.1	57.6
07/03/16	17:00	66.7	80.9	62.7	57.5
07/03/16	17:15	70.9	93.4	63.4	57.5
07/03/16	17:30	66.2	81.3	63.1	57.5
07/03/16	17:45	66.2	72.1	62.9	57.7
07/03/16	18:00	68.4	81.3	65.5	57.6
07/03/16	18:15	67.8	82.2	63.9	57.3
07/03/16	18:30	72.2	90.8	63.1	57.2
07/03/16	18:45	64.5	72.8	60.6	56.9
07/03/16	19:00	66.8	83.7	62.4	56.3
07/03/16	19:15	65.9	73.1	63.3	56.0
07/03/16	19:30	64.5	69.5	61.8	55.1
07/03/16	19:45	65.1	71.8	62.3	55.5
07/03/16	20:00	65.6	75.2	62.6	55.2
07/03/16	20:15	64.0	64.6	61.0	55.3
07/03/16	20:30	65.2	79.7	61.7	55.2
07/03/16	20:45	64.6	72.7	61.5	54.9
07/03/16	21:00	64.9	79.8	60.9	54.2
07/03/16	21:15	65.7	77.3	62.6	55.6
07/03/16	21:30	66.1	81.1	62.3	56.5
07/03/16	21:45	63.5	72.9	60.2	55.4
07/03/16	22:00	65.2	74.7	62.1	55.5
07/03/16	22:15	63.4	67.5	60.1	55.2
07/03/16	22:30	64.4	65.4	61.3	52.9
07/03/16	22:45	64.5	72.2	61.3	52.1
07/03/16	23:00	68.0	85.5	60.6	49.9
07/03/16	23:15	63.3	69.0	60.6	50.2
07/03/16	23:30	63.4	66.3	60.7	49.4
07/03/16	23:45	63.1	66.2	60.5	50.1
08/03/16	00:00	63.8	66.8	61.5	50.5
08/03/16	00:15	65.6	78.1	62.3	49.2
08/03/16	00:30	62.9	68.3	60.5	50.9
08/03/16	00:45	61.8	65.8	59.6	49.6
08/03/16	01:00	62.4	67.2	60.5	48.2
08/03/16	01:15	61.5	65.9	59.9	47.9
08/03/16	01:30	61.6	66.3	59.6	48.6
08/03/16	01:45	66.7	76.5	63.6	49.2
08/03/16	02:00	60.5	66.1	59.2	48.7
08/03/16	02:15	68.8	85.5	63.6	49.3
08/03/16	02:30	61.6	67.5	60.2	49.1
08/03/16	02:45	61.3	65.9	59.7	49.6
08/03/16	03:00	62.1	66.9	60.5	49.7
08/03/16	03:15	61.8	66.0	59.8	49.9
08/03/16	03:30	61.2	68.0	60.1	49.1
08/03/16	03:45	61.8	73.5	60.1	49.7
08/03/16	04:00	60.9	65.7	59.4	49.3
08/03/16	04:15	60.6	64.1	59.2	49.6
08/03/16	04:30	61.9	66.8	60.3	50.7
08/03/16	04:45	61.7	64.7	59.6	50.6
08/03/16	05:00	61.5	72.6	59.6	50.5
08/03/16	05:15	62.1	67.4	60.1	50.6
08/03/16	05:30	63.5	66.9	61.6	51.8

Date	Time	L_{Aeq} dB	L_{Amax} dB	L_{A10} dB	L_{A90} dB
08/03/16	05:45	64.1	66.7	62.2	52.7
08/03/16	06:00	65.0	69.5	62.8	54.0
08/03/16	06:15	65.0	71.1	63.0	53.4
08/03/16	06:30	65.3	67.9	62.6	55.1
08/03/16	06:45	65.3	75.0	62.2	55.2
08/03/16	07:00	65.8	78.3	62.5	56.3
08/03/16	07:15	65.4	72.7	62.4	55.9
08/03/16	07:30	67.1	81.7	63.0	54.8
08/03/16	07:45	65.3	71.6	62.4	56.2
08/03/16	08:00	65.2	70.3	62.3	56.2
08/03/16	08:15	64.6	69.7	61.5	55.8
08/03/16	08:30	64.6	68.0	61.4	56.2
08/03/16	08:45	65.9	73.0	62.9	56.7
08/03/16	09:00	65.5	69.9	62.5	57.0
08/03/16	09:15	65.3	71.7	61.8	56.9
08/03/16	09:30	65.2	66.9	62.1	57.3
08/03/16	09:45	65.3	70.3	61.7	57.6
08/03/16	10:00	65.9	73.3	62.6	57.2
08/03/16	10:15	68.3	79.8	64.8	58.6
08/03/16	10:30	66.5	72.9	63.1	58.4
08/03/16	10:45	68.1	83.5	63.8	58.0
08/03/16	11:00	65.7	71.7	62.6	57.6
08/03/16	11:30	65.8	71.4	62.5	58.1

APPENDIX D

Calculated Noise Levels

Client	Honest Burgers
Job:	1286
Location:	Tottenham Court Road
Subject:	Noise from proposed plant
Receptor:	Properties in Tottenham Court Road

Frequency	**63**	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**	**Linear**	**dB(A)**
Wavelength	5.5	2.8	1.4	0.7	0.35	0.175	0.09	0.045		
A-wtg	-26.2	-16.1	-8.6	-3.2	0.0	1.2	1.0	-1.1		
Kitchen Extract	62.0	62.0	74.0	75.0	75.0	74.0	70.0	61.0	81.1	79.9
Directionality	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		
Attenuator	7.0	10.0	16.0	19.0	24.0	19.0	16.0	14.0		
Distance	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		
Atten	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0		
Barrier pd	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1		
Atten	5.6	6.2	7.2	8.7	10.9	13.6	16.5	19.5		
Level at receptor	27.4	23.8	28.9	25.3	18.1	19.4	15.6	5.6	33.2	27.0
Aircon Condenser 1	58	57	55	52	49	44	39	32	62.4	54.1
Directionality	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		
Distance	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5		
Atten	10.9	10.9	10.9	10.9	10.9	10.9	10.9	10.9		
Barrier pd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
Atten	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
	5.0	5.0	6.0	7.0	13.0	13.0	13.0	12.0		
Level at receptor	37.1	36.1	33.1	29.1	20.1	15.1	10.1	4.1	40.9	29.8
Louvre Atten										
Aircon Condenser 2	58	57	55	52	49	44	39	32	62.4	54.1
Directionality	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		
Distance	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5		
Atten	10.9	10.9	10.9	10.9	10.9	10.9	10.9	10.9		
Barrier pd	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Atten	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Louvre Atten	5.0	5.0	6.0	7.0	13.0	13.0	13.0	12.0		
Level at receptor	37.1	36.1	33.1	29.1	20.1	15.1	10.1	4.1	40.9	**29.8**
Contd/….										

Frequency	63	125	250	500	1k	2k	4k	8k	Linear	dB(A)
Supply Fan 1	61.0	61.0	73.0	74.0	74.0	73.0	69.0	60.0	80.1	78.9
Directionality	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0		
Attenuator	7.0	11.0	22.0	35.0	42.0	38.0	26.0	21.0		
Distance	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		
Atten	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0		
Barrier pd	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Atten	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Level at receptor	30.0	26.0	27.0	15.0	8.0	11.0	19.0	15.0	33.1	23.9
Supply Fan 2	58.0	58.0	67.0	69.0	65.0	63.0	60.0	53.0	73.1	70.7
Directionality	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0		
Attenuator	3.0	4.0	8.0	13.0	15.0	12.0	10.0	10.0		
Distance	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		
Atten	22.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0		
Barrier pd	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Atten	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Level at receptor	23.0	25.0	30.0	27.0	21.0	22.0	21.0	14.0	33.9	29.6
Small extract fan	59.0	69.0	67.0	64.0	60.0	62.0	56.0	50.0	72.9	67.6
Attenuator	5.0	7.0	14.0	28.0	37.0	36.0	25.0	18.0		
Distance	3.0	3.0	3.0	33.0	3.0	3.0	3.0	3.0		
Atten	17.5	17.5	17.5	38.4	17.5	17.5	17.5	17.5		
Directionality	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Barrier pd	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Atten	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Level at receptor	36.5	44.5	35.5	-2.4	5.5	8.5	13.5	14.5	45.6	30.9
Façade	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Total Level	45.2	48.7	43.0	37.0	29.1	28.2	27.5	22.7	51.3	**39.8**

Client	Honest Burgers
Job:	1286
Location:	Tottenham Court Road
Subject:	Noise from proposed plant
Receptor:	Properties in Grafton Way

Frequency	**63**	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**	**Linear**	**dB(A)**
Wavelength	5.5	2.8	1.4	0.7	0.35	0.175	0.09	0.045		
A-wtg	-26.2	-16.1	-8.6	-3.2	0.0	1.2	1.0	-1.1		
Kitchen Extract	62.0	62.0	74.0	75.0	75.0	74.0	70.0	61.0	81.1	79.9
Directionality	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		
Attenuator	7.0	10.0	16.0	19.0	24.0	19.0	16.0	14.0		
Distance	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0		
Atten	24.9	24.9	24.9	24.9	24.9	24.9	24.9	24.9		
Barrier pd	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1		
Atten	5.6	6.2	7.2	8.7	10.9	13.6	16.5	19.5		
Level at receptor	24.5	20.9	25.9	22.4	15.2	16.5	12.6	2.6	30.3	24.1
Aircon Condenser 1	58	57	55	52	49	44	39	32	62.4	54.1
Directionality	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Distance	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5		
Atten	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0		
Barrier pd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
Atten	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Louvre Atten	5.0	5.0	6.0	7.0	13.0	13.0	13.0	12.0		
Level at receptor	45.0	44.0	41.0	37.0	28.0	23.0	18.0	12.0	48.8	37.7
Aircon Condenser 2	58	57	55	52	49	44	39	32	62.4	54.1
Directionality	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0		
Distance	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5		
Atten	10.9	10.9	10.9	10.9	10.9	10.9	10.9	10.9		
Barrier pd	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Atten	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Louvre Atten	5.0	5.0	6.0	7.0	13.0	13.0	13.0	12.0		
Level at receptor	32.1	31.1	28.1	24.1	15.1	10.1	5.1	-0.9	35.9	**24.8**
Contd/……										

Frequency	63	125	250	500	1k	2k	4k	8k	Linear	dB(A)
Supply Fan 1	61.0	61.0	73.0	74.0	74.0	73.0	69.0	60.0	80.1	78.9
Directionality	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		
Attenuator	7.0	11.0	22.0	35.0	42.0	38.0	26.0	21.0		
Distance	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5		
Atten	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0		
Barrier pd	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Atten	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Level at receptor	33.0	29.0	30.0	18.0	11.0	14.0	22.0	18.0	36.2	26.9
Supply Fan 2	58.0	58.0	67.0	69.0	65.0	63.0	60.0	53.0	73.1	70.7
Directionality	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		
Attenuator	3.0	4.0	8.0	13.0	15.0	12.0	10.0	10.0		
Distance	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		
Atten	17.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5		
Barrier pd	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Atten	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Level at receptor	32.5	34.5	39.5	36.5	30.5	31.5	30.5	23.5	43.4	39.0
Small extract fan	59.0	69.0	67.0	64.0	60.0	62.0	56.0	50.0	72.9	67.6
Attenuator	5.0	7.0	14.0	28.0	37.0	36.0	25.0	18.0		
Distance	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		
Atten	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0		
Directionality	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Barrier pd	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Atten	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Level at receptor	32.0	40.0	31.0	14.0	1.0	4.0	9.0	10.0	41.1	26.6
Façade	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Total Level	48.9	49.1	47.0	43.0	35.6	35.3	34.3	28.0	53.8	**44.8**