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Acoustic Consultancy Report

Environmental Noise Survey Results and Noise Impact Assessment for Fixed Plant

Restaurant, 74 Southampton Row

Client:	Caskade Catering Limited
Project:	Restaurant 74 Southampton Row London WC1B 4AR
Our Ref:	11132
Revision:	C
Report Prepared By	N. Fowler M.I.O.A.
Date:	2nd March 2018

1.0 Introduction

1.1 Acoustic Consultancy Partnership Ltd were appointed by Caskade Catering Limited to undertake an environmental noise survey and carry out a noise impact assessment for the new fixed plant at the proposed restaurant at 74 Southampton Row, London.

1.2 This report provides the results of our environmental noise survey and establishes the resultant plant noise levels for the proposed plant in accordance with the requirements of the London Borough of Camden for noise levels from new plant and machinery.

1.3 The predicted plant noise levels for the proposed plant have been established based on the latest plant selections and noise data provided to us. A plant noise assessment has been included within this report detailing the resultant noise levels at the nearest affected noise sensitive properties, which for this site are the residential located above the premises in Southampton Row and the residential to the rear that front onto Old Gloucester Street.

1.4 In accordance with the London Borough of Camden requirements, the target noise levels determined within this report have been used to complete a plant noise assessment, taking into account the operational period of the plant items and their location in relation to the nearest noise sensitive facades.

2.0 Environmental Noise Survey Measurement Procedure

2.1 The environmental noise survey adopted the procedure and methodology stated within BS4142:2014. This report has been prepared to provide the Local Planning Authority with existing ambient and background noise levels covering the periods of operation of the proposed plant at the rear of the premises.

3.0 Site Description and Nearest Noise Sensitive Buildings

3.1 The ground floor premises had been occupied by La Roccia but are now un-occupied. There are five floors of residential above the premises.

3.2 At the rear of the premises is a courtyard area accessed from patio doors at ground floor level. The courtyard area also faces the rear façade of the residential fronting onto Old Gloucester Street.

3.3 It should be noted that we were not able to gain access to the premises or the rear yard area because the landlords had secured the property and no access authority could be obtained.

3.4 The proposed plant would be as follows:

a) The 2no proposed condensers, reference CU1 and CU2 serving the kitchen and restaurant, and the 2no proposed condensers reference CR1 and CR2 serving the cold rooms, will be installed at the rear courtyard area accessed from the ground floor of the building. These units will be positioned along the rear wall of the courtyard

b) The new kitchen extract fan (EF1) would be located within the existing extract ductwork that passes up the rear of the building to discharge at the roof level.

c) The main kitchen canopy supply fan (SF1) and the general extract fan serving the toilets and general areas (EF2) would both be mounted internally with external wall mounted louvred openings facing onto the courtyard area.

3.5 Full details of the individual plant items and operating periods are given in section 6.0.

4.0 Receptor Positions

4.1 From photographs previously taken at the rear of the premises the nearest existing noise sensitive receptors, with line of sight to the 4no proposed condensers, would be the upper three floors of flats above the proposed restaurant. The 4th floor windows will be the nearest with a view of the condenser units in the rear courtyard. These windows will only have partial line of sight to the wall mounted louvres serving SF1 and EF2 or the kitchen extract (EF1) discharge opening at roof level. The distance from the centre of the courtyard area to the nearest residential windows would be approximately 8m.

4.2 The nearest windows to the rear of the properties fronting Old Gloucester Street could have line of sight to the 4no condenser units although the brick wall behind the units may give partial line of sight protection to some windows. The properties would have line of sight to the wall mounted louvres serving SF1 and EF2 and the kitchen extract duct, although the discharge opening faces away from the properties. The nearest windows are approximately 15m from the centre of the courtyard area.

4.3 Based on the above, we confirm the receptor positions adopted for this report are as follows:

RPA Fourth floor rear windows of the residential above the proposed restaurant.

RPB Rear façade of the residential fronting Old Gloucester Street.

5.0 Plant Information

5.1 The plant models and location are given below.

Unit No	Plant Item	Sound Pressure Level, dB at 1m							
		63	125	250	500	1k	2k	4k	8k
CU1	CU1- Mitsubishi PUHZ-ZRP140YKA	59	57	55	49	46	42	36	29
CU2	CU2-Mitsubishi PUHZ-ZRP140YKA	59	57	55	49	46	42	36	29

Table 1 – Plant Sound Pressure Levels at 1m

Unit No	Plant Item	Sound Pressure Level, dBA at 3m
CR1	Chiller RoomCondenser	41
CR2	Freezer Room Condenser	38

Table 2 – Plant Sound Pressure Levels at 1m

Note: The above noise levels for units CU1, CU2, CR1 and CR2 are measured in free field conditions over a reflecting plane. The noise data for units CR1 and CR2 are based on the low noise option units.

Unit No	Plant Item	Sound Power Level, dB							
		63	125	250	500	1k	2k	4k	8k
EF1	Kitchen extract-Elta SCPP500/4/3	77	77	83	80	80	78	74	68
SF1	Kitchen supply-Elta SCPP450/4/3	71	72	81	78	74	70	64	58
EF2	General extract-Elta SJ250A	65	66	68	70	66	65	61	57

Table 3 – Plant Sound Power Levels

6.0 Plant Operating Periods

6.1 We have been advised the proposed operating hours of the restaurant will be between the hours of 07.00-midnight on Mondays to Thursdays, from 07.00 to 01.00 hours on Fridays and Saturdays and from 09.00 to midnight on Sundays and Bank Holidays.

6.2 We have allowed for the HVAC plant to operate for the proposed trading hours. The refrigeration plant, items CR1 and CR2 serving the coldrooms, will operate 24 hours a day, 7 days a week upon demand.

7.0 Environmental Noise Survey Monitoring Position

7.1 It should be noted that we were not able to gain access to the premises or the rear yard area because the landlords had secured the property and no access authority could be obtained. We have, therefore, undertaken the environmental readings off site in Old Gloucester Street which runs parallel to the rear of the premises.

7.2 The microphone was greater than 3.5m from any vertical reflecting surface and the monitoring position is confirmed on the site plan in Appendix 2.

8.0 Monitoring Equipment

8.1 The noise monitoring equipment comprised of a Svantek 957 type 1 real time analyser, serial number 21434, with a weatherproof microphone protection system. The microphone was mounted on a tripod and a weatherproof windshield and bird spike were used.

8.2 The meter calibration was verified before and after the measurement period by a Svantek SV31 acoustic calibrator, serial number 24687. Any deviation was within an acceptable tolerance.

8.3 The meter and calibrator have current calibration certificates available upon request.

9.0 Noise Monitoring Period and Survey Weather Conditions

9.1 The survey was carried out between midnight and 01.15 and between 02.00 and 03.00 hours on Wednesday 25th October 2017.

9.2 The weather was dry and still with partial cloud cover. The temperature was 15°C.

9.3 The weather was acceptable for environmental noise monitoring.

10.0 Noise Measurement Parameters

10.1 The survey established the prevailing L_{AFmax}, $L_{Aeq,T}$, $L_{A10,T}$, and $L_{A90,T}$ noise levels, measured using F time weighting, with a 15 minute reference time period.

11.0 Monitoring Observations and Results

11.1 We consider the survey results to be representative of the typical background and ambient noise levels affecting the rear of the residential properties facing the courtyard area of the proposed restaurant.

11.2 The dominant noise sources were traffic movement from the surrounding area and occasional pedestrian activity. There were occasional cars along Old Gloucester Street, which is one way.

11.3 The results of the survey are confirmed in Appendix 1.

12.0 Local Authority Criteria for Fixed Plant

12.1 The London Borough of Camden standard noise requirement is specified in the Camden Local Plan, adopted version dated July 2017. Camden Policy A4: Noise and Vibration makes reference to the Noise and Vibration Thresholds provided in Appendix 3.

12.2 Appendix 3 identifies the following thresholds for noise and vibration in terms of the "effect" levels described in the National Planning Policy Framework and Planning Practice Guidance.

NOEL – No Observed Effect Level
LOAL – Lowest Observed Adverse Effect Level
SOAEL – Significant Observed Adverse Effect Level

12.3 The Industrial and Commercial Noise Sources section detailed in Appendix 3 state:

"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 (BS4142) will be used. For such cases a Rating Level of 10dB below background (15dB if tonal components are present) should be considered as the design criterion.

Table C: Noise levels applicable to proposed industrial and commercial developments (including plant and machinery)

Existing Noise Sensitive Receptor	Assessment Location	Design Period	LOAEL (Green)	LOAEL to SOAEL (Amber)	SOAL (Red)
Dwellings	Outside 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
	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}

12.4 This type of modern air conditioning plant would not have a distinguishable discrete continuous note audible at the receptor positions.

12.5 Based on the requirements of Table C, and the results of our environmental noise survey given in Appendix 1, the cumulative plant noise criteria to be achieved at the façades of both receptor positions would be:

Cumulative Plant Noise Criteria for Plant Operation up to 01.00 Hours **41 dB $L_{Aeq,T}$**

Cumulative Plant Noise Criteria for Continuous Plant Operation **38 dB $L_{Aeq,T}$**

13.0 Predicted Plant Noise Levels

13.1 The predicted **un-attenuated** cumulative free field plant noise levels are given below.

Receptor Position	Plant Operating Period	Predicted Total Plant Noise Level $L_{Aeq(15min)}$ dB	Target Plant Noise Level $L_{Aeq(15min)}$ dB
RPA	Up to 01.00	55	41
	Continuous	37	38
RPB	Up to 01.00	53	41
	Continuous	32	38

Table 4 – Cumulative Plant Noise Levels at Receptor Positions

14.0 Mitigation

14.1 It can be seen from the table above, the predicted un-attenuated cumulative plant noise levels will exceed the London Borough of Camden target criteria of 10 dBA below the lowest measured L_{A90T} for the operating period of the plant up to 01.00 hours, at the facades of both receptor positions.

14.2 To achieve the London Borough of Camden criteria it will be necessary to provide mitigation measures.

14.3 The proposed mitigation measures are as detailed below:

a) In duct attenuators on the atmosphere side of the kitchen supply and both extract fans. The minimum attenuation performances figures are detailed below:

Plant	Minimum Required Insertion Loss, dB							
	63	125	250	500	1k	2k	4k	8k
EF1 Kitchen extract discharge	7	17	28	44	41	29	18	13
SF1 Kitchen supply intake	6	11	26	39	37	28	22	13
EF2 General extract discharge	4	6	14	27	26	24	20	12

Table 5– Fans Minimum Attenuator Insertion Loss Requirements

b) The four external condenser units (CU1 and CU2) are positioned at the rear of the courtyard area and it is our recommendation that acoustic wall lining should be positioned behind all four units to minimise reverberant build up in the courtyard area.

The external face of the rear wall of the courtyard is to be lined with 100mm thick acoustic wall lining panels constructed from 100mm thick 45kg/m^3 rockwall slab infill material with fibreglass tissue facing retained by 0.8mm thick 35% free area expanded metal. The top of the lining should terminate at least 600mm above the top of the highest unit and should be the full width of the courtyard.

The infill is to be inert, non-hygroscopic, rot proof, vermin proof and have Class 1 rating for spread of flame. It is to be bagged with “Melinex sheet” and all joints sealed to prevent water ingress to the rockwall slabs.

The panel minimum coefficient of absorption is to be as detailed below

63	125	250	500	1k	2k	4k	8k Hz
0.17	0.54	1.0	1.0	1.0	1.0	1.0	0.84

14.4 The predicted **attenuated** cumulative free field plant noise levels allowing for the duct attenuation and the wall lining are given below.

Receptor Position	Plant Operating Period	Predicted Total Plant Noise Level $L_{Aeq(15min)}$ dB	Target Plant Noise Level $L_{Aeq(15min)}$ dB
RPA	Up to 01.00	40	41
	Continuous	34	38
RPB	Up to 01.00	32	41
	Continuous	29	38

Table 6 – Cumulative Plant Noise Levels at Receptor Positions

14.5 The plant noise level calculations are given in Appendix 3.

15.0 Vibration Isolation

15.1 All plant items are to be suitably vibration isolated using proprietary mountings or hangers depending on the fixing method to be adopted. The mounting systems are to provide a static deflection suitable to achieve a minimum 98% isolation efficiency.

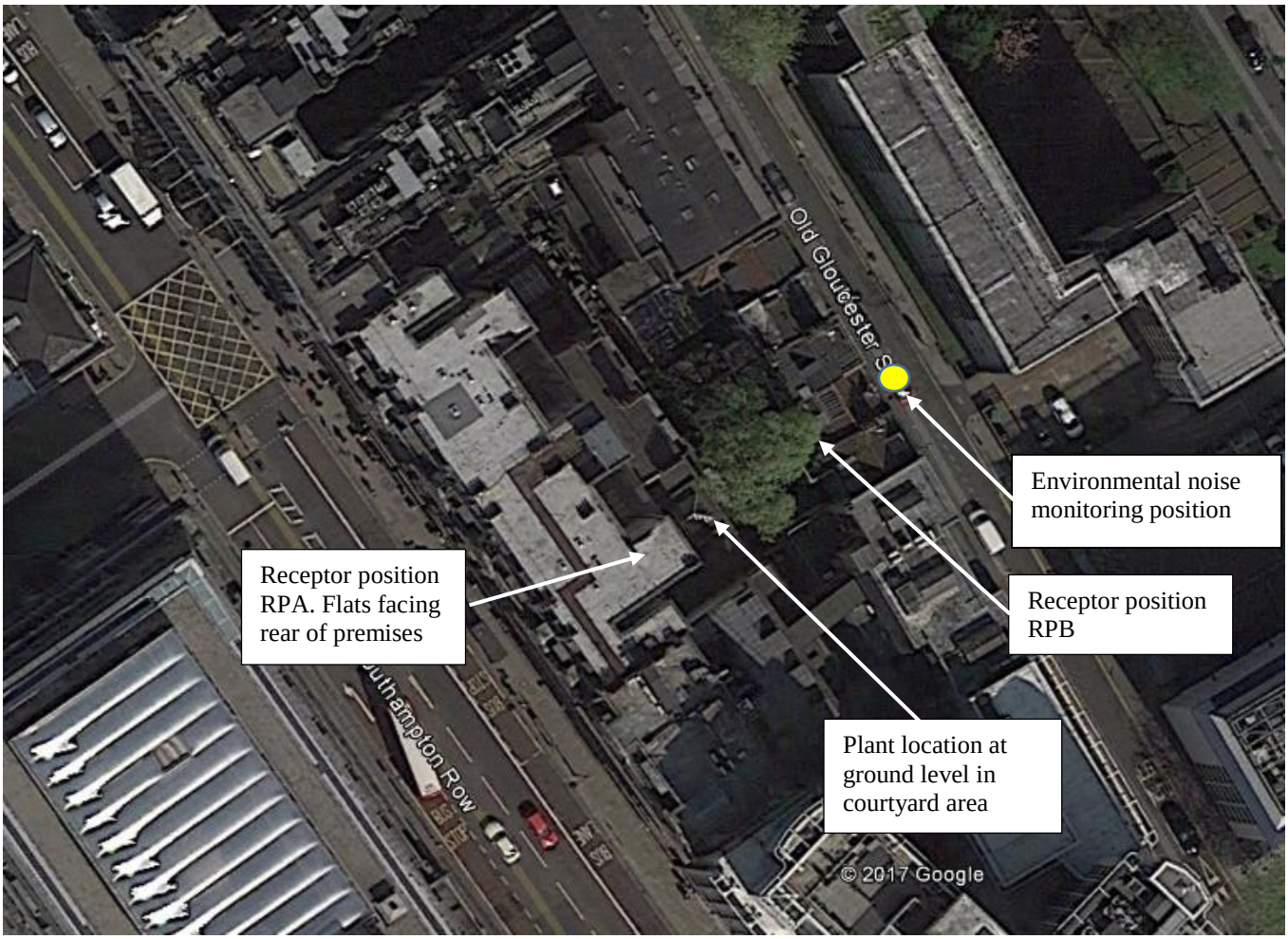
16.0 Conclusions

16.1 Providing the mitigation measures detailed in section 14.3 a) and b) are implemented in full, the London Borough of Camden external criteria, as detailed in section 12.0 will be achieved at both receptor positions.

Appendix 1 – Results

Date	Time			Measured Noise Level, dB			
				L_{AFmax}	$L_{Aeq,T}$	L_{A10}	L_{A90}
Wednesday 25th October 2017	00.00	to	00.15	72.8	53.4	54.2	51.0
	00.15	to	00.30	74.6	54.6	54.8	51.0
	00.30	to	00.45	72.5	53.5	53.7	50.5
	00.45	to	01.00	76.9	54.7	54.1	50.5
	01.00	to	01.15	78.4	55.3	54.7	50.6
	02.00	to	02.15	73.0	54.5	53.3	48.1
	02.15	to	02.30	76.7	52.8	52.0	47.9
	02.30	to	22.45	73.4	53.3	54.1	47.5
	02.45	to	03.00	87.0	57.3	52.6	47.5

Appendix 2 – Site Plan



Appendix 3 – Plant Noise Level Calculations - Plant Operation up to 01.00 Hours

Plant Calcs for Octave Band Sound Pressure Level

Project: Restauarant 74 Southampton Row

Date: 02.03.2018

Section Total, dBA	Day	37.1	Nigh	37.1
ALL PLANT TOTAL	Day	40.1	Nigh	40.1

RPA

CU1										Day "y"	Night "y"
Lp at 1m, Q=2		59	57	55	49	46	42	36	29		
A weight		-26	-16	-8.6	-3.2		1.2	1	-1.1		
Directivity Q=	2	0	0	0	0	0	0	0	0		
Barrier (enter as +ve)	a										
Distance correction m	8	-18.1	-18.1	-18.1	-18.1	-18.1	-18.1	-18.1	-18.1	y	y
Other Correction (+ve or -ve)											
Other Correction (+ve or -ve)											
Resultant dBA		15	23	28	28	28	25	19	10		
Overall dBA		34.0									

CU2										Day	Night
Lp at 1m, Q=2		59	57	55	49	46	42	36	39		
A weight		-26	-16	-8.6	-3.2		1.2	1	-1.1		
Directivity Q=	2	0	0	0	0	0	0	0	0		
Barrier (enter as +ve)	a										
Distance correction m	8	-18.1	-18.1	-18.1	-18.1	-18.1	-18.1	-18.1	-18.1	y	y
Other Correction (+ve or -ve)											
Other Correction (+ve or -ve)											
Resultant dBA		15	23	28	28	28	25	19	20		
Overall dBA		34.2									

RPB

CU1										Day "y"	Night "y"
Lp at 1m, Q=2		59	57	55	49	46	42	36	29		
A weight		-26	-16	-8.6	-3.2		1.2	1	-1.1		
Directivity Q=	2	0	0	0	0	0	0	0	0		
Barrier (enter as +ve)	b	5	5	5	5	5	5	5	5		
Distance correction m	15	-23.5	-23.5	-23.5	-23.5	-23.5	-23.5	-23.5	-23.5	y	y
Other Correction (+ve or -ve)											
Other Correction (+ve or -ve)											
Resultant dBA		4	12	18	17	17	15	8	-1		
Overall dBA		23.6									

CU2										Day	Night
Lp at 1m, Q=2		59	57	55	49	46	42	36	39		
A weight		-26	-16	-8.6	-3.2		1.2	1	-1.1		
Directivity Q=	2	0	0	0	0	0	0	0	0		
Barrier (enter as +ve)	b	5	5	5	5	5	5	5	5		
Distance correction m	15	-23.5	-23.5	-23.5	-23.5	-23.5	-23.5	-23.5	-23.5	y	y
Other Correction (+ve or -ve)											
Other Correction (+ve or -ve)											
Resultant dBA		4	12	18	17	17	15	8	9		
Overall dBA		23.7									

Plant Calcs for Broadband Sound Pressure Level

Project: Restauarant 74 Southampton Row

Date: 02.03.2018

Section Total, dBA	Day	34.3	Night	34.3
ALL PLANT TOTAL	Day	40.1	Night	40.1

RPA

Item	Lp, Q=2	Data Distance	Assessment Distance	Barrier Attenuation (enter +ve)	Directivity Q=		Night Reduction (enter +ve)	Other Correction (+ve or -ve)	Resultant Day dBA	Day "y"	Night "y"
CR1	41	3	8	-8.52	2	0			32.5	y	y
CR2	38	3	8	-8.52	2	0			29.5	y	y

Plant Calcs for Broadband Sound Pressure Level

Section Total, dBA	Day	23.8	Night	23.8
ALL PLANT TOTAL	Day	32.4	Night	32.4

RPB

Item	Lp, Q=2	Data Distance	Assessment Distance	Barrier Attenuation (enter +ve)	Directivity Q=		Night Reduction (enter +ve)	Other Correction (+ve or -ve)	Resultant Day dBA	Day "y"	Night "y"
CR1	41	3	15	-14	5	2	0		22.0	y	y
CR2	38	3	15	-14	5	2	0		19.0	y	y

Fan Calcs for In duct Sound Power Levels

Project: Restauarant 74 Southampton Row

Date: 02.03.2018

Section Total, dBA	Day	28.4	Night	28.4
ALL PLANT TOTAL	Day	39.3	Night	39.3

RPA

EF1										Day "y"	Night "y"
Induct Lw		77	77	83	80	80	78	74	68		
End reflection loss (enter +ve)											
Directivity (enter +ve)				-3	-7	-15	-15	-15	-15		
Distance correction	3	-20.5	-20.5	-20.5	-20.5	-20.5	-20.5	-20.5	-20.5		
Barrier attenuation	b	5	5	5	5	5	5	5	5		
Other correction (enter + or -)										y	y
Other correction (enter + or -)											
A weighting		-26.2	-16.1	-8.6	-3.2		1.2	1	-1.1		
Attenuation IL (enter +ve)		7	17	28	44	41	29	18	13		
Resultant dBA		18.3	18.4	17.9	0.3	-1.5	9.7	16.5	13.4		
Overall dBA		24.4									

SF1										Day	Night
Induct Lw		71	72	81	78	74	70	64	58		
End reflection loss (enter +ve)											
Directivity (enter +ve)		4	5	6	7	8	9	9	9		
Distance correction	10	-31.0	-31.0	-31.0	-31.0	-31.0	-31.0	-31.0	-31.0		
Barrier attenuation	b	5	5	5	5	5	5	5	5		
Other correction (enter + or -)										y	y
Other correction (enter + or -)											
A weighting		-26.2	-16.1	-8.6	-3.2		1.2	1	-1.1		
Attenuation IL (enter +ve)		6	11	26	39	37	28	22	13		
Resultant dBA		6.8	13.9	16.4	6.8	9.0	16.2	16.0	16.9		
Overall dBA		23.4									

EF2										Day	Night
Induct Lw		65	66	68	70	66	65	61	57		
End reflection loss (enter +ve)											
Directivity (enter +ve)		4	5	6	7	8	9	9	9		
Distance correction	10	-31.0	-31.0	-31.0	-31.0	-31.0	-31.0	-31.0	-31.0		
Barrier attenuation	b	5	5	5	5	5	5	5	5		
Other correction (enter + or -)										y	y
Other correction (enter + or -)											
A weighting		-26.2	-16.1	-8.6	-3.2		1.2	1	-1.1		
Attenuation IL (enter +ve)		4	6	14	27	26	24	20	12		
Resultant dBA		2.8	12.9	15.4	10.8	12.0	15.2	15.0	16.9		
Overall dBA		23.0									

RPB

EF1										Day "y"	Night "y"
Induct Lw		77	77	83	80	80	78	74	68		
End reflection loss (enter +ve)											
Directivity (enter +ve)				-3	-7	-15	-15	-15	-15		
Distance correction	17	-35.6	-35.6	-35.6	-35.6	-35.6	-35.6	-35.6	-35.6		
Barrier attenuation	a										
Other correction (enter + or -)										y	y
Other correction (enter + or -)											
A weighting		-26.2	-16.1	-8.6	-3.2		1.2	1	-1.1		
Attenuation IL (enter +ve)		7	17	28	44	41	29	18	13		
Resultant dBA		8.2	8.3	7.8	-9.8	-11.6	-0.4	6.4	3.3		
Overall dBA		14.3									

SF1										Day	Night
Induct Lw		71	72	81	78	74	70	64	58		
End reflection loss (enter +ve)											
Directivity (enter +ve)		4	5	6	7	8	9	9	9		
Distance correction	15	-34.5	-34.5	-34.5	-34.5	-34.5	-34.5	-34.5	-34.5		
Barrier attenuation	a										
Other correction (enter + or -)										y	y
Other correction (enter + or -)											
A weighting		-26.2	-16.1	-8.6	-3.2		1.2	1	-1.1		
Attenuation IL (enter +ve)		6	11	26	39	37	28	22	13		
Resultant dBA		8.3	15.4	17.9	8.3	10.5	17.7	17.5	18.4		
Overall dBA		24.8									

EF2										Day	Night
Induct Lw		65	66	68	70	66	65	61	57		
End reflection loss (enter +ve)											
Directivity (enter +ve)		4	5	6	7	8	9	9	9		
Distance correction	15	-34.5	-34.5	-34.5	-34.5	-34.5	-34.5	-34.5	-34.5		
Barrier attenuation	b	5	5	5	5	5	5	5	5		
Other correction (enter + or -)										y	y
Other correction (enter + or -)											
A weighting		-26.2	-16.1	-8.6	-3.2		1.2	1	-1.1		
Attenuation IL (enter +ve)		4	6	14	27	26	24	20	12		
Resultant dBA		-0.7	9.4	11.9	7.3	8.5	11.7	11.5	13.4		
Overall dBA		19.4									

Appendix 3 – Plant Noise Level Calculations – Continuous Plant Operation

Plant Calcs for Broadband Sound Pressure Level					
Project: Restauarant 74 Southampton Row					
Date: 02.03.2018					
Section Total, dBA	Day	34.3	Night	34.3	
ALL PLANT TOTAL	Day	34.3	Night	34.3	

RPA

Item	Lp, Q=2	Data Distance	Assessment Distance		Barrier Attenuation (enter +ve)	Directivity Q=		Night Reduction (enter +ve)	Other Correction (+ve or -ve)	Resultant Day dBA	Day "y"	Night "y"			
CR1	41	3	8	-8.52		2	0			32.5	y	y	#N/A	#N/A	1
CR2	38	3	8	-8.52		2	0			29.5	y	y	#N/A	#N/A	2

Plant Calcs for Broadband Sound Pressure Level					
Section Total, dBA	Day	28.8	Night	28.8	
ALL PLANT TOTAL	Day	28.8	Night	28.8	

RPB

Item	Lp, Q=2	Data Distance	Assessment Distance		Barrier Attenuation (enter +ve)	Directivity Q=		Night Reduction (enter +ve)	Other Correction (+ve or -ve)	Resultant Day dBA	Day "y"	Night "y"		
CR1	41	3	15	-14		2	0			27.0	y	y	#N/A	#N/A
CR2	38	3	15	-14		2	0			24.0	y	y	#N/A	#N/A