REPORT TITLE:

Brill Place, London, NW1

Noise Impact Assessment and Planning Condition 73

CLIENT DETAILS:

Henry Construction

DATE:

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REPORT REFERENCE:

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-	Checked and Authorised	22/11/22	JCB	MJ

1 Summary

Pace Consult Limited was commissioned by Henry Construction to undertake a noise impact assessment of the proposed plant units serving the proposed development name Brill Place, London, NW1, affecting the nearest noise sensitive receptors.

This report has been prepared in accordance with national acoustic guidelines and British Standards such as BS4142:2014 *Methods for rating and assessing industrial and commercial units* and Planning Condition 73.

The noise impact assessment based on the methodology contained within the BS4142:2014 has anticipated that the specific sound levels (noise from plant units) will have a low impact at the nearest noise sensitive receptors.

The noise assessment also shows that the noise emission from the proposed plant is more than 10 dB below the measured background at the nearest noise sensitive receptors, which is fully compliant with the criteria recommended by the planning condition 73.

2 Introduction

Pace Consult Limited was commissioned by Henry Construction to undertake a noise impact assessment of the proposed plant units serving the proposed development name Brill Place, London, NW1, affecting the nearest noise sensitive receptors

This report has been prepared in accordance with national acoustic guidelines and BS such as BS4142:2014 *Methods for rating and assessing industrial and commercial units* and Planning Condition 73.

A previous noise survey was completed by Hoare lea and documented the findings in the report reference *REP-1011463-AP-20191122-Stage 3 acoustics report-Rev01-F* dated February 2020. Calculated noise data from the proposed plant units at the nearest noise sensitive receptors were assessed against the noise criteria recommended within the Hoare lea report.

The levels used in the calculations have been submitted by Henry Construction, the M&E technical submittals and plant manufacturer's data. To undertake the outdoor sound level calculations Part 2 of ISO 9613 Acoustics -- Attenuation of sound during propagation outdoors -- Part 2: General method of calculation was used. This ISO standard is incorporated in the SoundPLAN v 8.2 software. This software was used to generate outdoor sound levels from the Plant units to the nearest noise sensitive receptors and to produce noise contour maps.

The sound pressure levels from the proposed plant were assessed during the night time with all plant items operating continuously.

3 Criteria

The external noise emission criteria at the nearest noise sensitive receptors, as taken from the Hoare Lea report, are as follows:

7.2.2 Plant noise limits.

Based on the London Borough of Camden requirements, the cumulative maximum sound pressure levels for fixed plant, equipment and machinery associated with the development shall not exceed the levels presented in Table 7 at 1 m from the façade of the nearby residential premises.

Table 7 Maximum permissible sound pressure levels at 1m from the nearest noise sensitive premises

Time of day	Daytime (07:00 - 23:00)	Night (23:00 - 07:00)
Normal operation	L_{Aeq} 44 dB[1]	L_{Aeq} 37 dB[1]
During operation of emergency plant	L_{Aeq} 59 dB	L_{Aeq} 52 dB

[1] If plant noise contains any tonal characteristics, a further 5 dB reduction shall be applied.

Figure 1. Recommneded plant noise criteria.

3.1 Nearest noise sensitive receptors.

The nearest noise sensitive receptors included within the noise assessment are included below.

Figure 2. Nearest noise sensitive receptors.

3.2 Acoustic criteria: BS 4142:2014+A1:2019 Methods for rating and assessing industrial and commercial sound

This standard sets out a methodology for the assessment of noise from factories, industrial premises or fixed installations and sources of an industrial/commercial nature.

The procedure contained in BS4142 for assessing the impact is to compare the measured or predicted noise level from the source in question, the 'specific noise level', at the assessment position with the correct background noise level for the worst-case time of operation.

Where the noise contains a 'distinguishable, discreet, continuous note (whine, hiss, screech, hum etc.) or if there are distinct impulses in the noise (bangs, clicks or clatters), or if the noise is irregular enough to attract attention' then a range of correction factors can be added to the specific noise level as appropriate to obtain the 'rating level'.

As this is a prescriptive report prior to plant installation, overall rating noise levels will be specified for the new installation. Compliance with the rating value will be necessary to provide evidence that significant adverse impact has been avoided as required by the NPSE.

To assess the impact, the measured background noise level is subtracted from the rating noise level. BS4142 states:

The significance of sound of an industrial and/or commercial nature depends upon both the margin by which the rating level of the specific sound source exceeds the background sound level and the context in which the sound occurs. 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 assessment and arriving at decisions, therefore, it is essential to place the sound in context.

Obtain an initial estimate of the impact of the specific sound by subtracting the measured background sound level (See Clause 8) from the rating level (see Clause 9) and consider the following.

a) Typically, the greater the difference, the greater the magnitude of the impact.

b) A difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context.

c) A difference of around 5dB is likely to be an indication of an adverse impact, depending on the context.

d) 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.

Where the initial estimate of the impact needs to be modified due to the context, take all pertinent factors into consideration, including the following.

1) The absolute level of sound. For a given difference between the rating level and the background sound level, the magnitude of the overall impact might be greater for an acoustic environment where the residual sound level is high than for an acoustic environment where the residual sound level is low.

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.

Where residual sound levels are very high, the residual sound might itself result in adverse impacts or significant adverse impacts, and the margin by which the rating level exceeds the background might simply be an indication of the extent to which the specific sound source is likely to make those impacts worse.

2) The character and level of the residual sound compared to the character and level of the specific sound. Consider whether it would be beneficial to compare the frequency spectrum and temporal variation of the specific sound with that of the ambient or residual sound, to assess the degree to which the specific sound source is likely to be distinguishable and will represent an incongruous sound by comparison to the acoustic environment that would

occur in the absence of the specific sound. Any sound parameters, sampling periods and averaging time periods used to undertake character comparisons should reflect the way in which sound of an industrial and/or commercial nature is likely to be perceived and how people react to it.

3) The sensitivity of the receptor and whether dwellings or other premises used for residential purposes will already incorporate design measures that secure good internal and/or outdoor acoustic conditions, such as;

i) Façade sound insulation treatment

ii) Ventilation and/or cooling that will reduce the need to have windows open so as to provide rapid or purge ventilation; and Acoustic screening.

3.3 Acoustic Criteria: Planning Condition 73

Planning condition 73 is included below for reference.

Prior to first use of the relevant part of the development, details of plant machinery shall be submitted to and approved in writing by the Local Planning Authority . The measures shall ensure that the external noise level emitted from plant/machinery/equipment will be lower than the lowest existing background noise level by at least 5dBA, by 10dBA where the source is tonal, as assessed according to BS4142:2014 at the nearest and/or most affected noise sensitive premises, with all machinery operating together at maximum capacity. A post installation noise assessment shall be carried out where required to confirm compliance with the noise criteria and additional steps to mitigate noise shall be taken, as necessary. Approved details shall be implemented prior to occupation of the development and thereafter be permanently retained.

4 Calculation assumptions

The figure below shows the location of the plant items and associated noise levels used in the noise impact calculations.

4.1 Plant location.

- **Basement Level**

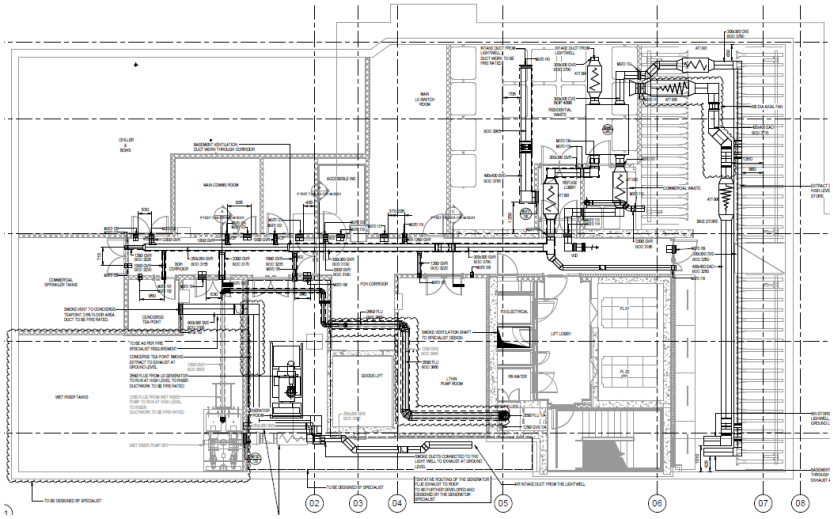

Figure 3. Plant location basement level.

- **Ground Floor Mezzanine**

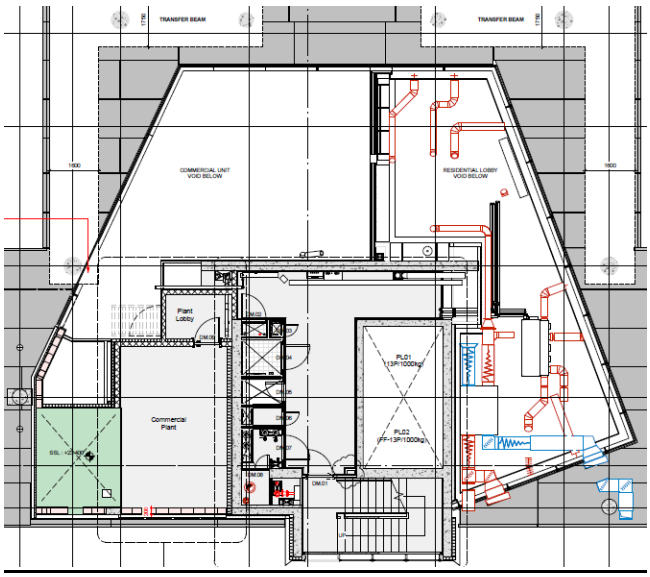

Figure 4. Plant location mezzanine level.

- **Seventeenth Floor open plant Area.**

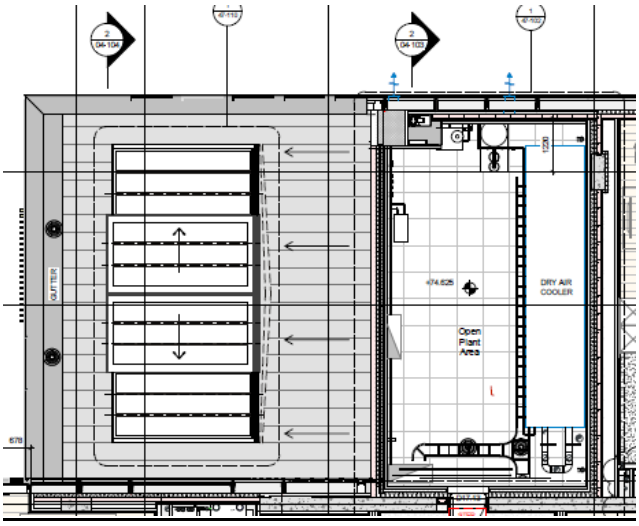

Figure 5. Plant location 17th floor.

- MVHR units serving the residential units.

4.2 Plant noise levels.

Basement.

Pumps, MVHR. The exhaust and intake ductworks serving these units are connected across the lightwell at ground floor level. The ductworks include a noise attenuator which is selected to provide a sound reduction of NR40 at 5 m.

Emergency generator. Sound pressure level of 88 dBA at 7 m.

Mezzanine floor.

MVHR units. The exhaust and intake ductworks include a noise attenuator with a sound reduction of NR40 at 5 m.

Level 17

Adiabatic dry air cooler. Sound power LW 74 dBA.

Twenty second floor

Emergency smoke extract fan.

Sound Data

Spectrum (Hz):	63	125	250	500	1K	2K	4K	8K	dBW	dB(A) @ 3m
Inlet (dB):	97	95	102	109	117	110	101	93	119	98
Outlet (dB):	101	97	100	107	116	111	103	94	118	97

Sound levels are quoted as in-duct values. dB(A) values are average spherical free-field for comparative use only.

Figure 6. Extract fan sound data.

MVHR in each residential unit.

Maxi Plus BY

Maxi Plus BY		Sound Power Levels, L_w (dB) - Octave Bands Frequency Hz.								Sound Pressure dBA @ 3m
Curve Ref		63	125	250	500	1k	2k	4k	8k	
100% (238 l/sec)	Extract	67	63	66	64	64	61	58	54	
	Supply	72	68	71	69	69	66	63	59	
	Breakout	68	63	63	55	37	31	21	18	39.4
80% (186 l/sec)	Extract	63	58	61	59	58	55	51	46	
	Supply	68	63	66	64	63	60	56	51	
	Breakout	67	61	61	52	36	30	20	13	37.2
60% (135 l/sec)	Extract	58	52	53	51	51	48	43	35	
	Supply	63	57	58	56	56	53	48	40	
	Breakout	67	59	57	48	34	27	18	12	33.8
40% (84 l/sec)	Extract	51	44	44	42	42	37	31	21	
	Supply	56	49	49	47	47	42	36	26	
	Breakout	63	54	50	40	26	20	12	12	27.3
20% (35 l/sec)	Extract	40	32	30	29	27	24	3	4	
	Supply	45	37	35	34	32	29	8	9	
	Breakout	55	51	39	34	19	10	8	11	20.4
The breakout dB(A) sound pressure values are given for hemispherical free field propagation at a distance of 3m from the unit										

Figure 7. Maxi Plus sound data (curve ref 60%).

Maxi

Maxi		Sound Power Levels, L_w (dB) - Octave Bands Frequency Hz.								Sound Pressure dBA @ 3m
Curve Ref		63	125	250	500	1k	2k	4k	8k	
100% (177 l/sec)	Extract	52	57	61	58	59	58	55	50	
	Supply	57	62	66	63	64	63	60	55	
	Breakout	53	57	58	50	33	29	19	11	34.3
80% (138 l/sec)	Extract	48	53	55	53	54	52	49	42	
	Supply	53	58	60	58	59	57	54	47	
	Breakout	52	56	56	47	32	28	18	11	32.1
60% (99 l/sec)	Extract	42	47	48	46	47	45	40	32	
	Supply	47	52	53	51	52	50	45	37	
	Breakout	51	54	52	44	31	26	16	10	28.7
40% (60 l/sec)	Extract	36	40	40	37	38	36	30	18	
	Supply	41	45	45	42	43	41	35	23	
	Breakout	48	50	46	35	23	19	12	10	22.5
20% 23 l/sec]	Extract	27	29	27	22	22	19	8	5	
	Supply	32	34	32	27	27	24	15	6	
	Breakout	44	50	37	28	16	11	10	10	18.0
The breakout dB(A) sound pressure values are given for hemispherical free field propagation at a distance of 3m from the unit										

Figure 8. Maxi sound data (curve ref 60%).

Midi

Midi		Sound Power Levels, L_w (dB) - Octave Bands Frequency Hz.								Sound Pressure dBA @ 3m
Curve Ref		63	125	250	500	1k	2k	4k	8k	
100% (101 l/sec)	Extract	65	65	63	63	59	58	57	54	
	Supply	70	70	68	68	64	63	62	59	
	Breakout	55	57	53	42	34	31	24	17	29.7
80% (79 l/sec)	Extract	61	61	58	58	54	53	50	46	
	Supply	66	66	63	63	59	58	55	51	
	Breakout	53	57	49	38	32	28	21	15	27.2
60% (58 l/sec)	Extract	55	55	51	51	47	45	41	36	
	Supply	60	60	56	56	52	50	46	41	
	Breakout	50	55	45	36	30	23	16	13	24.4
40% (36 l/sec)	Supply	52	51	46	46	43	40	34	26	
	Breakout	42	52	41	36	27	17	12	11	21.6
20% (14 l/sec)	Extract	33	32	24	24	22	18	8	4	
	Supply	38	37	29	29	27	23	14	7	
	Breakout	38	52	35	28	18	10	10	11	19.2
The breakout dB(A) sound pressure values are given for hemispherical free field propagation at a distance of 3m from the unit.										

Figure 9. Midi sound data (curve ref 60%).

MVHR unit includes a sound attenuator with the following Insertion Losses dB.

Table 1 MVHR unit attenuator IL dB.							
63	125	250	500	1k	2k	4k	8k
2	4	8	16	32	29	26	15

5 Calculation Summary

The table below shows the highest calculated sound levels at the nearest noise sensitive receptors.

Table 2. Calculated Sound Pressure Level dBA	
ID	Calculated Sound Pressure Level dBA
R1	21
R2	23

The calculation takes into consideration the sound reduction offered by the proposed attenuators.

The table overleaf includes an example of the sound propagation calculation based on the highest calculated sound levels (R2).

The calculated sound pressure considers the sound power per unit provided by the manufacturer, correction for propagation in limited spatial angle, distance source – receiver, mean attenuation due to geometrical spreading, mean attenuation due to ground effect, mean attenuation due to screening, mean attenuation due to air absorption, and level increase due to reflection from solid surfaces.

Table 3. Detailed noise propagation calculation.

Source	Source type	Li dB(A)	R'w dB	L'w dB(A)	Lw dB(A)	l or A m,m²	Ko dB	S m	Adiv dB	Agr dB	Abar dB	Aatm dB	dLrefl dB(A)	Ls dB(A)	Lr dB(A)
R2															
Basement ventilation plant room across lightwell	Point			60.2	60.2		0	72.71	-48.2	3	-21.4	-0.6	16.3	9.3	9
17th Floor Plant Facade 01	Area	57	32	29.6	42	17.3	3	73.5	-48.3	3	-19.9	-0.1	2.5	-17.9	-18
17th Floor Plant Facade 02	Area	58	32	30.3	42.3	15.9	3	70.3	-47.9	3	-5.7	-0.1	2.3	-3.1	-3
17th Floor Plant Facade 03	Area	57	32	29.6	42	17.3	3	72.59	-48.2	3	-0.1	-0.1	2.5	2.1	2
17th Floor Plant Facade 04	Area	57	32	29	44.8	38.8	3	75.22	-48.5	3	-17.9	-0.1	2.6	-13.1	-13
MVHR Apartment 1.1 Exhaust	Point			22.6	22.6		0	52.33	-45.4	3	0	-0.2	4.2	-15.9	-16
MVHR Apartment 1.1 FAI	Point			27.4	27.4		0	57.24	-46.1	3	-9.9	-0.1	1.7	-24.1	-24
MVHR Apartment 2.1 Exhaust	Point			25.8	25.8		0	55.91	-45.9	3	0	-0.6	2.5	-15.2	-15
MVHR Apartment 2.1 FAI	Point			23.5	23.5		0	50.54	-45.1	3	0	-0.2	4.1	-14.6	-15
MVHR Apartment 3.4 Exhaust	Point			25	25		0	81.87	-49.3	3	0	-0.3	2.6	-19	-19
MVHR Apartment 3.4 FAI	Point			31.3	31.3		0	78.89	-48.9	3	0	-0.3	2.6	-12.3	-12
MVHR mezzanine floor exhaust	Point			60.2	60.2		0	69.72	-47.9	3	-21.5	-0.5	16.3	9.6	10
MVHR mezzanine floor Intake	Point			60.2	60.2		0	74.02	-48.4	3	-21.4	-0.6	16.3	9.2	9
17th Floor Plant Roof	Area	57	0	56.6	73.2	46.1	0	73.69	-48.3	3	-7.5	-0.3	2.6	22.7	23
											Cumulative Noise levels				**23**

The figure overleaf includes the legend of the acoustic parameters used to calculate the sound pressure level at receivers.

Legend

Source		Source name
Source type		Type of source (point, line, area)
Li	dB(A)	Level inside
R'w	dB	Rated transmission loss
L'w	dB(A)	Sound power level per m, m²
Lw	dB(A)	Sound power level per unit
l or A	m,m²	Size of source (length or area)
Ko	dB	Correction for propagation in limited spacial angle
S	m	Distance source - receiver
Adiv	dB	Mean attenuation due to geometrical spreading
Agr	dB	Mean attenuation due to ground effect
Abar	dB	Mean attenuation due to screening
Aatm	dB	Mean attenuation due to air absorption
dLrefl	dB(A)	Level increase due to reflections
Ls	dB(A)	Unassessed sound pressure level at receiver Ls=Lw+Ko+ADI+Adiv+Agr+Abar+Aatm+Afol_site_house+Awind+dLrefl
Lr	dB(A)	Assessed level of time slice

Figure 10. Acoustic parameters.

The figure below includes the noise map of the study area.

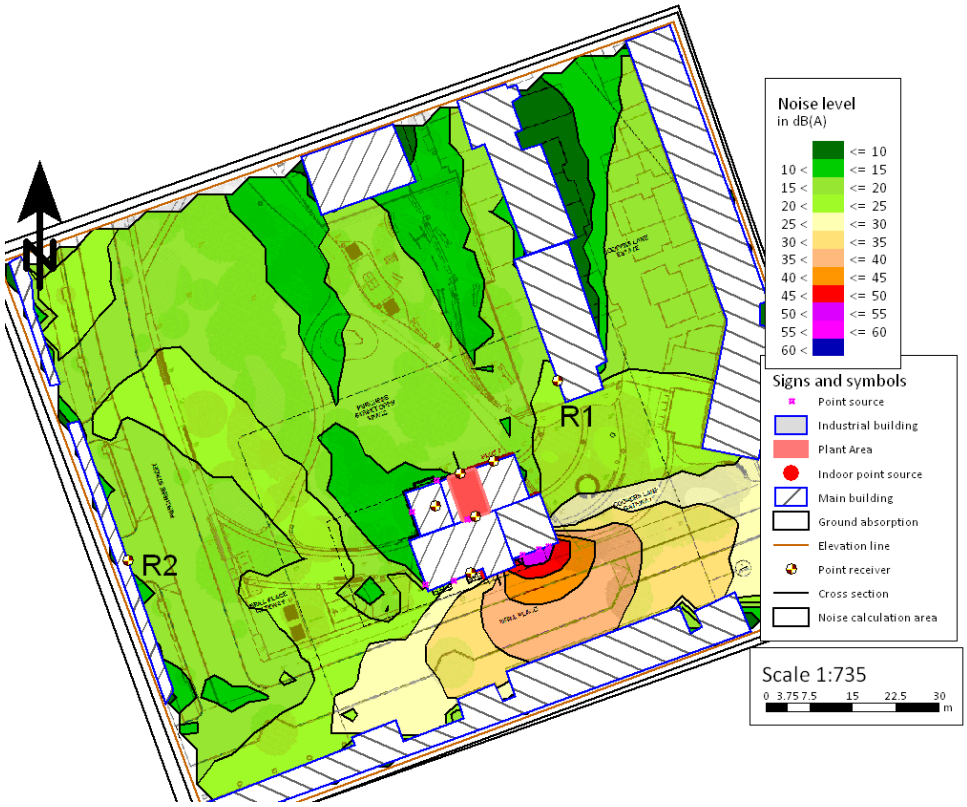

Figure 11. Noise map.

6 BS4142:2014 Assessment

The table below shows the assessment method recommended by BS4142:2014 *Method for rating and assessing industrial and commercial sound.*

The frequency contains of the units do not show a detectable tonality, also the calculated noise levels are excessively below the measured background, and therefore it is considered that no tonalities correction should be included within the assessment.

Table 4. BS4142:2014 Assessment. Night time

ID	Calculated Sound Pressure Level dBA	correction as discussed in BS4142:2014	LA90 dB	Excess of rating over background level
R1	21	0	37	-16
R2	23			-14

The table above shows that the calculated noise levels are more than 10 dB below the measured background, which is an indication that the specific sound levels (noise emission from plant) will have a low impact at the nearest noise sensitive receptors.

Regarding condition 73. The noise assessment shows that the noise emission from the proposed plant is more than 10 dB below the measured background at the nearest noise sensitive receptors, which is fully compliant with the criteria recommended by the planning condition.

6.1 Emergency plant.

The noise impact of the proposed emergency plants are included in the table below.

Emergency generator noise impact.

Table 5. Noise Assessment.

ID	Calculated Sound Pressure Level dBA	LA90 dB	Excess of rating over background level
R1	23	59	-36
R2	20		-39

The table below includes the smoke extract fan noise impact.

Table 3. Noise Assessment.			
ID	Calculated Sound Pressure Level dBA	LA90 dB	Excess of rating over background level
R1	50	59	-9
R2	52		-7

Based on the assessment tables, it is recommended that the maintaining test of the smoke extract fan and generator will be completed during the afternoon period (12:00 to 14:00), which have the highest measured background levels in order to avoid noise nuisance at the nearest noise sensitive receptors.

7 Conclusions

The BS4142:2014 environmental noise assessment has anticipated that the specific sound levels (noise from the proposed plant units) will have a low impact at the nearest noise sensitive receptors.

The noise assessment also shows that the noise emission from the proposed plant is more than 10 dB below the measured background at the nearest noise sensitive receptors, which is fully compliant with the criteria recommended by planning condition 73.