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Dear Nic,

Your reference: Littlehampton Leisure Centre - Environmental Noise Impact Assessment

Our reference: PC-16-0169-LT1 Rev C

Further to the environmental noise survey and the recently provided drawings, I am pleased to provide findings of our environmental sound level calculations for the units located externally at the Littlehampton Leisure Centre.

1. Introduction

Pace Consult Ltd completed a background noise survey and documented the findings in the report PC-16-0169-RP1 Rev A dated 25th October 2016. Noise data representative of the nearest noise sensitive receptors was assessed against current legislation.

The expected plant noise levels at the nearest noise sensitive receptors to the Littlehampton Leisure Centre have been calculated and compared against the lowest measured background noise levels.

The levels used in the calculations were extracted from 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 7.4 software. This software was used to generate outdoor sound levels from the Littlehampton Leisure Centre to the nearest noise sensitive receptors and to produce noise contour maps.

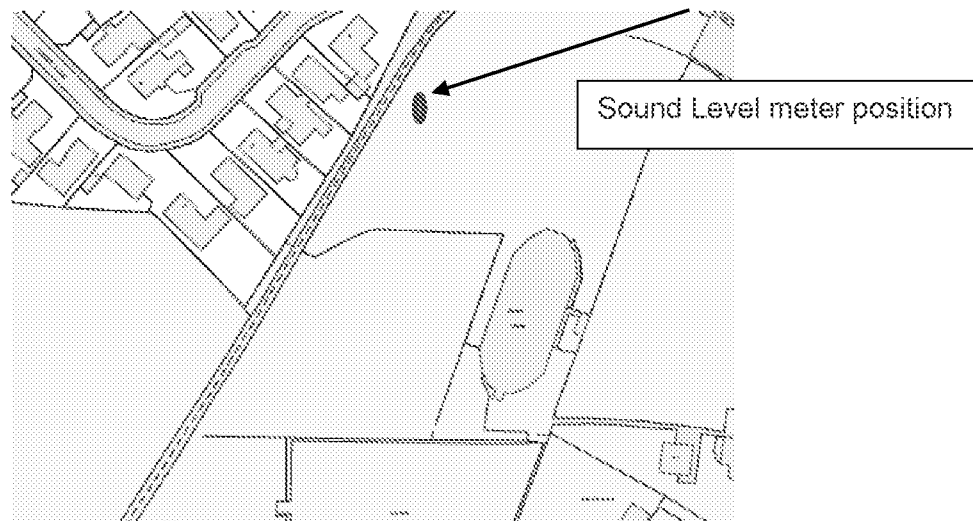
The sound pressure levels from the Littlehampton Leisure Centre have been assessed during night time period with all plant items operating continuously.

2. Criteria – Noise rating level at noise sensitive receptors

Measured noise levels at the nearest noise sensitive receptors, as taken from report PC-16-0169-RP1-RevA are as follows:

Table 2 : Lowest measured L_{A90} , dB levels during survey			
Time	L_{Amax} (fast) dB	L_{Aeq} dB	$L_{A90,1 \text{ hr min}}$ dB
07:00 / 23:00	85	44	30
			$L_{A90,15 \text{ min}}$ dB
23:00 / 07:00	68	36	28

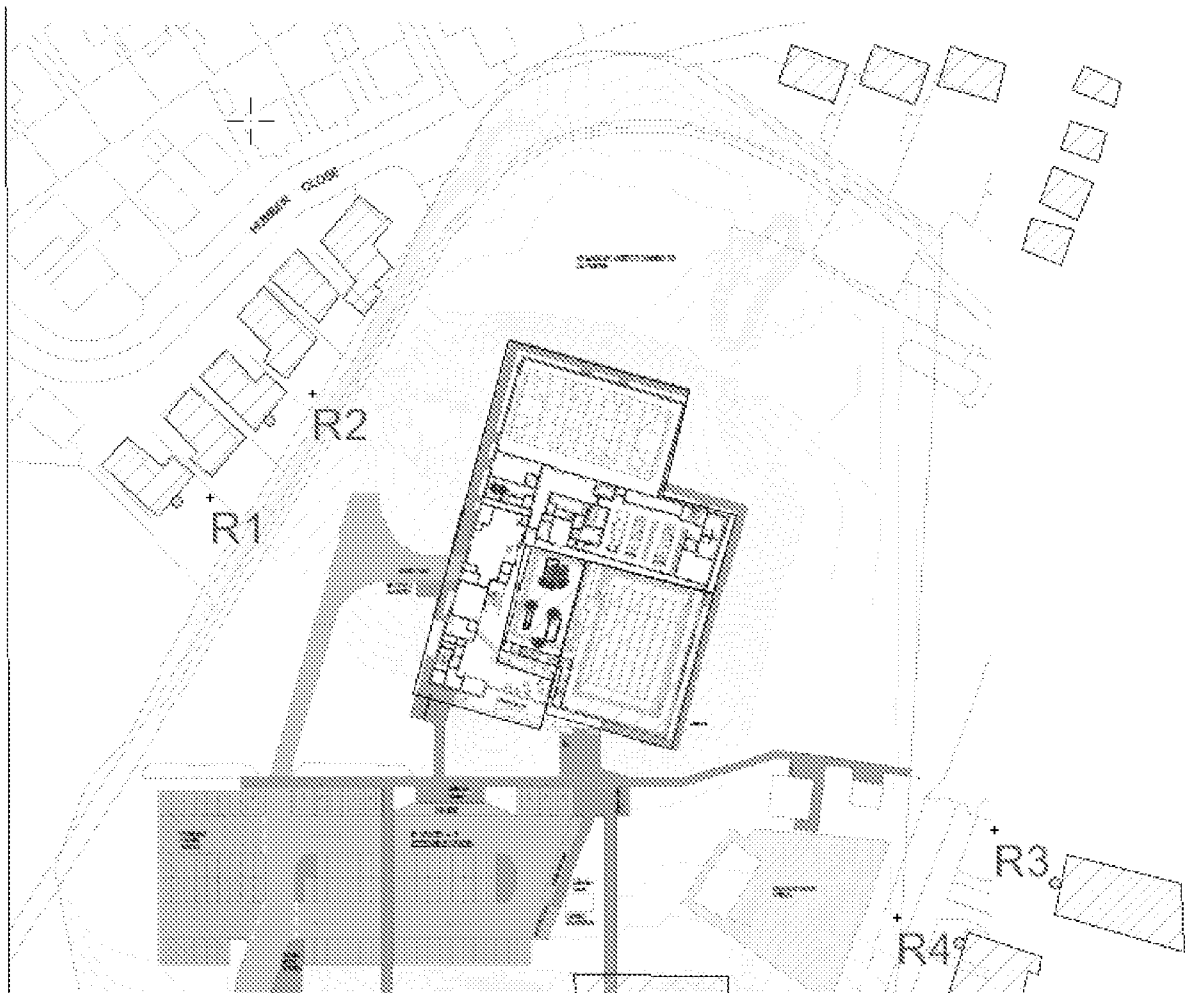
The figure below shows the noise measurement location.



The measurement position is representative of the nearest noise sensitive receptors to the development.

The environmental assessment was undertaken in accordance with the methodology described in BS 7445:1997 and in BS4142:2014.

The figure below shows the nearest noise sensitive receptors used within the assessment which are as follows.



R1 and R2 Humber Close.

R3 and R4: Hendon Avenue.

The outdoor sound levels were calculated in accordance with ISO 9613-2 “Acoustics- Attenuation of sound during propagation outdoors”. Although there are different methodologies to calculate the outdoor noise propagation, ISO 9613- 2 is well regarded for the evaluation of outdoor noise propagation. The Standards are integrated in the SoundPLAN v 7.4 software which was used to undertake the noise modelling.

2.1 Acoustic criteria: BS4142:2014

This standard sets out a methodology for the assessment of whether 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. Calculation assumptions

The noise data used for the calculations is as advised by the mechanical engineer, the tables and figures below show the noise sources used in the calculations.

3.1 Noise levels

Ground Floor

Cold Water Booster = L_w 80.5 dB

Booster = L_w 80.5 dB

Portable cold water booster = L_w 84.5 dB

Chemical Store Helios Extract Fan RRK 200

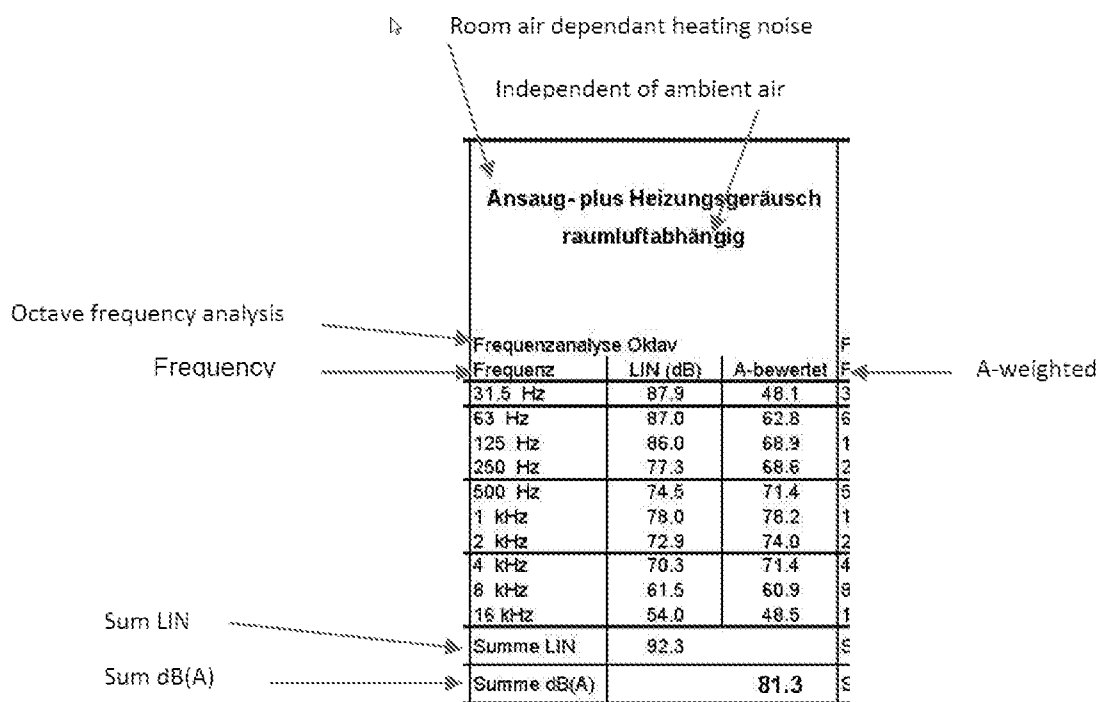
RRK 200										
Frequency		Hz	Total	125	250	500	1k	2k	4k	8k
L_{wa}	Case breakout	dB(A)	63	42	47	57	58	57	51	38
L_{wa}	Intake	dB(A)	73	51	64	71	69	65	62	54

Pool Filtration Plant Room Helios Extract Fan RKK 315

RRK 315										
Frequency		Hz	Total	125	250	500	1k	2k	4k	8k
L_{wa}	Case breakout	dB(A)	64	43	52	60	55	57	52	43
L_{wa}	Intake	dB(A)	73	45	59	65	67	68	66	61

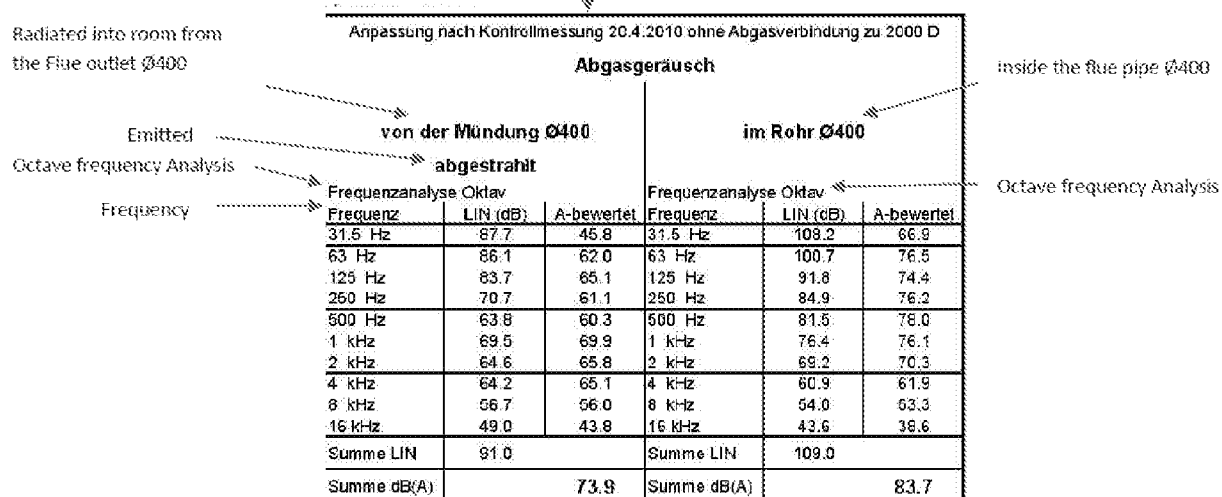
First Floor

2 x Boilers (UltraGas 1000)



This section of the of the analysis is for the noise assosiated with the flue

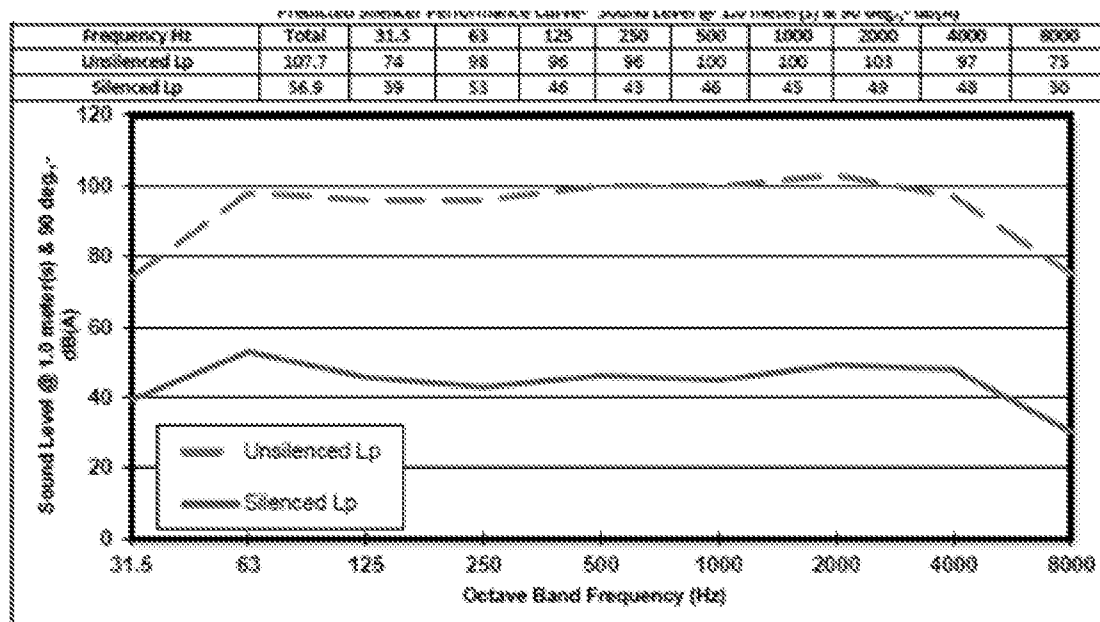
Adjustment to control measurement without 20.4 2010 exhaust connection to 2000 D



CHP Engine.

CHP noise break out from 'Enclosure SPL @1m' 70 dBA at 1 m.

CHP exhaust flue



Noise data for the CHP ventilation fan

Sound Power

Spectrum (Hz)	63	125	250	500	1K	2K	4K	8K	dBW	dBA @ 3m
Outlet PWL (dB)	75	77	81	80	79	77	79	69	87	69
Inlet PWL (dB)	75	77	79	80	81	77	73	59	87	64

Notes: Measurements were taken in a semi-anechoic chamber. dBA values are average values for free field for a

Flue attenuator

Fan Sizes	Silencer Length	Silencer Type	Insertion Loss @ Octave Band (Hz)							
			63	125	250	500	1k	2k	4k	8k
315-560	1D	ENP	-2	-5	-6	-9	-13	-11	-6	-6
		EP	-4	-6	-8	-11	-18	-19	-17	-14
	1.5D	ENP	-3	-6	-9	-13	-18	-14	-9	-8
		EP	-5	-8	-10	-16	-22	-22	-20	-18
	2D	ENP	-4	-8	-12	-17	-23	-17	-12	-10
		EP	-7	-10	-12	-21	-26	-26	-24	-22
1D	1D	ENP	-3	-4	-9	-15	-15	-9	-7	-6
		EP	-4	-5	-10	-16	-16	-10	-8	-7

8 x Circular Pumps = sound pressure levels 53 dBA

Roof Level

Boiler and CHP discharge flue

Mitsubishi Electric Units

OUTDOOR UNIT		Sound Pressure Level
[Ref]	[Model]	(dB)
OU.01	PUHZ-ZRP125YKA2	52
OU.02	PUHZ-ZRP125YKA2	52
OU.03	PUHZ-ZRP200YKA2	59
OU.04	PUHZ-ZRP200YKA2	59
OU.05	PUHZ-ZRP200YKA2	59
OU.06	PUHZ-ZRP200YKA2	59
OU.07	PUHZ-ZRP200YKA2	59
OU.08	PUHZ-ZRP200YKA2	59
OU.09	PUHZ-ZRP50VKA	46
OU.10	PUHZ-ZRP35VKA	46
OU.11	PUHZ-RP71VHA	48
OU.12	PUHZ-ZRP140YKA2	52
OU.13	PUHZ-ZRP35VKA	46
OU.14	PUHZ-ZRP35VKA	46

AHU 01

DBF (Hz)	63	125	250	500	1k	2k	4k	8k
Fresh air inlet	79	83	80	76	74	71	68	64
Supply air outlet	81	86	83	83	83	79	76	75
Extract air inlet	81	84	80	76	73	70	67	63
Exhaust air outlet	80	85	80	78	78	73	73	72
*Noise breakout	56	58	52	52	52	48	29	20

*Casing radiated sound pressure levels @ 3 m

AHU 02

sound levels

the unit contains fans for supply- and exhaust air

sound power [Lw] of supply air fan

octave band:	63	125	250	500	1000	2000	4000	8000 Hz	total
octave band on suction:	63.5	76.4	74.6	69.6	72.8	72.6	76.9	65.8 dB	80.7 dB(A)
octave band on pressure:	66.9	77.8	75	77.1	86.9	78.3	79.5	70 dB	88.6 dB(A)

sound power [Lw] of exhaust air fan

octave band:	63	125	250	500	1000	2000	4000	8000 Hz	total
octave band on suction:	63.7	76.5	76.4	73.1	73.5	73.5	77.4	71.3 dB	81.5 dB(A)
octave band on pressure:	67.5	76.5	75.9	78.4	80.4	79	78.9	73.5 dB	85.7 dB(A)

sound pressure level [Lp] present on the duct connection for fresh air (ODA)

octave band:	63	125	250	500	1000	2000	4000	8000 Hz	total
sound level:	63	72	70	63	64	61	63	50 dB	70 dB(A)

sound pressure level [Lp] present on the duct connection for supply air (SUP)

octave band:	63	125	250	500	1000	2000	4000	8000 Hz	total
sound level:	66	77	75	77	85	76	77	69 dB	87 dB(A)

sound pressure level [Lp] present on the duct connection for extract air (ETA)

octave band:	63	125	250	500	1000	2000	4000	8000 Hz	total
sound level:	63	73	71	65	65	62	63	55 dB	71 dB(A)

sound pressure level [Lp] present on the duct connection for exhaust air (EHA)

octave band:	63	125	250	500	1000	2000	4000	8000 Hz	total
sound level:	68	77	76	78	80	79	79	74 dB	86 dB(A)

sound pressure level [Lp] near the AHU

averaged sound pressure level on virtual surface [217.6 m²] according to EN ISO 3744 at distance 3 m

octave band:	63	125	250	500	1000	2000	4000	8000 Hz	total
sound level:	47	50	37	32	38	33	32	18 dB	42 dB(A)

AHU 03

sound levels

the unit contains fans for supply- and exhaust air

sound power [Lw] of supply air fans (2 parallel)

octave band:	63	125	250	500	1000	2000	4000	8000 Hz	total
octave band on suction:	72.1	77	83.5	80.1	75	73.8	71	71 dB	82.6 dB(A)
octave band on pressure:	76.1	80	91.5	87.1	85	80.8	77	75 dB	90.1 dB(A)

sound power [Lw] of exhaust air fans (2 parallel)

octave band:	63	125	250	500	1000	2000	4000	8000 Hz	total
octave band on suction:	72.1	77	83.5	80.1	75	73.8	71	71 dB	82.4 dB(A)
octave band on pressure:	76.1	81	91.5	87.1	85	79.6	77	75 dB	89.9 dB(A)

sound power level [Lw] present on the duct connection for fresh air (ODA)

octave band:	63	125	250	500	1000	2000	4000	8000 Hz	total
sound level:	75	78	85	80	75	72	68	67 dB	82 dB(A)

sound power level [Lw] present on the duct connection for supply air (SUP)

octave band:	63	125	250	500	1000	2000	4000	8000 Hz	total
sound level:	78	82	95	90	87	82	77	77 dB	92 dB(A)

sound power level [Lw] present on the duct connection for extract air (ETA)

octave band:	63	125	250	500	1000	2000	4000	8000 Hz	total
sound level:	74	77	84	80	74	72	68	67 dB	81 dB(A)

sound power level [Lw] present on the duct connection for exhaust air (ETA)

octave band:	63	125	250	500	1000	2000	4000	8000 Hz	total
sound level:	78	83	94	90	88	83	80	78 dB	93 dB(A)

sound power level [Lw] near the AHU

octave band:	63	125	250	500	1000	2000	4000	8000 Hz	total
sound level:	81	79	78	67	64	61	55	47 dB	73 dB(A)

Kitchen Extract

Sound Criteria								
Sound Power Levels re 1 pWatts (Hz):								
Hz	63	125	250	500	1k	2k	4k	8k
Induct Inlet	83	90	79	73	68	70	69	61
Induct Outlet	80	91	75	70	72	74	71	63
Breakout	76	84	71	65	59	61	54	39

The calculation assumes the following louvre free areas.

- Ground Floor 3 louvres with the following free areas 0.2 m2, 0.2 m2 and 5 m2
- First floor 3 louvres with the following free areas: 0.5 m2, 1 m2, 1 m2 (CHP Exhaust)

3.2 Mitigation measures

In order to meet the acoustic criteria recommended by BS4142:2014 the following noise mitigation measures have been incorporated in the calculation.

3.2.1 Removable panels

It is understood that the proposed external walls for both the ground & first floor plant rooms will be constructed of removable panels. These panels should be acoustically rated with the following sound reduction R_w dB.

63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	R_w dB
29	37	49	62	74	80	79	59

The above panels should be constructed using 2 x individual panels with a cavity between each panels of 100 mm. Each panels should have the following sound reduction

125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	R_w dB
27	34	48	61	66	70	47

The above panel can be selected from <http://www.kineticsnoise.com> or similar manufacturer.

The following louvres should be also acoustically rated with the following transmission losses (TL) dB.

Ground floor

Louvre free area 5 m²

63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz
10	14	27	41	45	45	36

First Floor

Louvre free area 0.5 m² and 1m²

63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz
19	29	50	54	54	54	44

The required TL dB are extremely high and it will be extremely difficult to achieve the require attenuation by an acoustic louvre. Alternative louvre locations or acoustic treatment of the boiler and CHP casing should be sought.

3.2.2 Fans

The proposed fans located at ground level (louvres 0.2m² free area) has a noise emission which is above the limiting criteria and therefore mitigation measures should be implemented. The maximum sound power emission from the louvres is L_w 48 dB, therefore an acoustic louvre with a minimum TL of 25 dB is recommended. The pool filtration fan discharging externally should be also treated acoustically with an acoustic louvre with a minimum TL of 25 dB.

Note: The required noise attenuation is very high to be provided by an acoustic louvre, therefore the required attenuation should be provided by acoustic silencers.

3.2.3 AHU units

The following attenuators are recommended.

Unit	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
AHU 01 Exhaust	8	11	16	24	23	23	24	17
AHU 01 Fresh Air	5	6	11	18	21	18	12	9
AHU 02 Fresh Air	8	12	23	38	43	34	21	16
AHU 02 Exhaust	8	12	23	38	43	34	21	16
AHU 03 Fresh Air	4	7	12	18	22	17	13	13
AHU 03 Exhaust	8	9	14	21	33	25	18	14
Boiler Flue	10	18	33	50	50	49	40	24
CHP Exhaust by manufacturer	7	10	12	21	26	26	24	22
Kitchen Extract enclosure by manufacturer	12	11	17	22	22	21	22	23

The noise break out across the AHU units is going to be reduced using the following construction:

Outer skin – plastic coated mild steel, 1 mm thick

Acoustic lining – bitumen based composite, 5 mm thick

Mineral wool insulation – 30 mm thick, density 50 kg/m³

Acoustic lining – bitumen based composite, 5 mm thick

Inner skin – plastic coated mild steel, 1 mm thick

The sound reduction of the above construction is included in the table below. The sound reduction is calculated using Insul 7.0 (sound insulation prediction software)

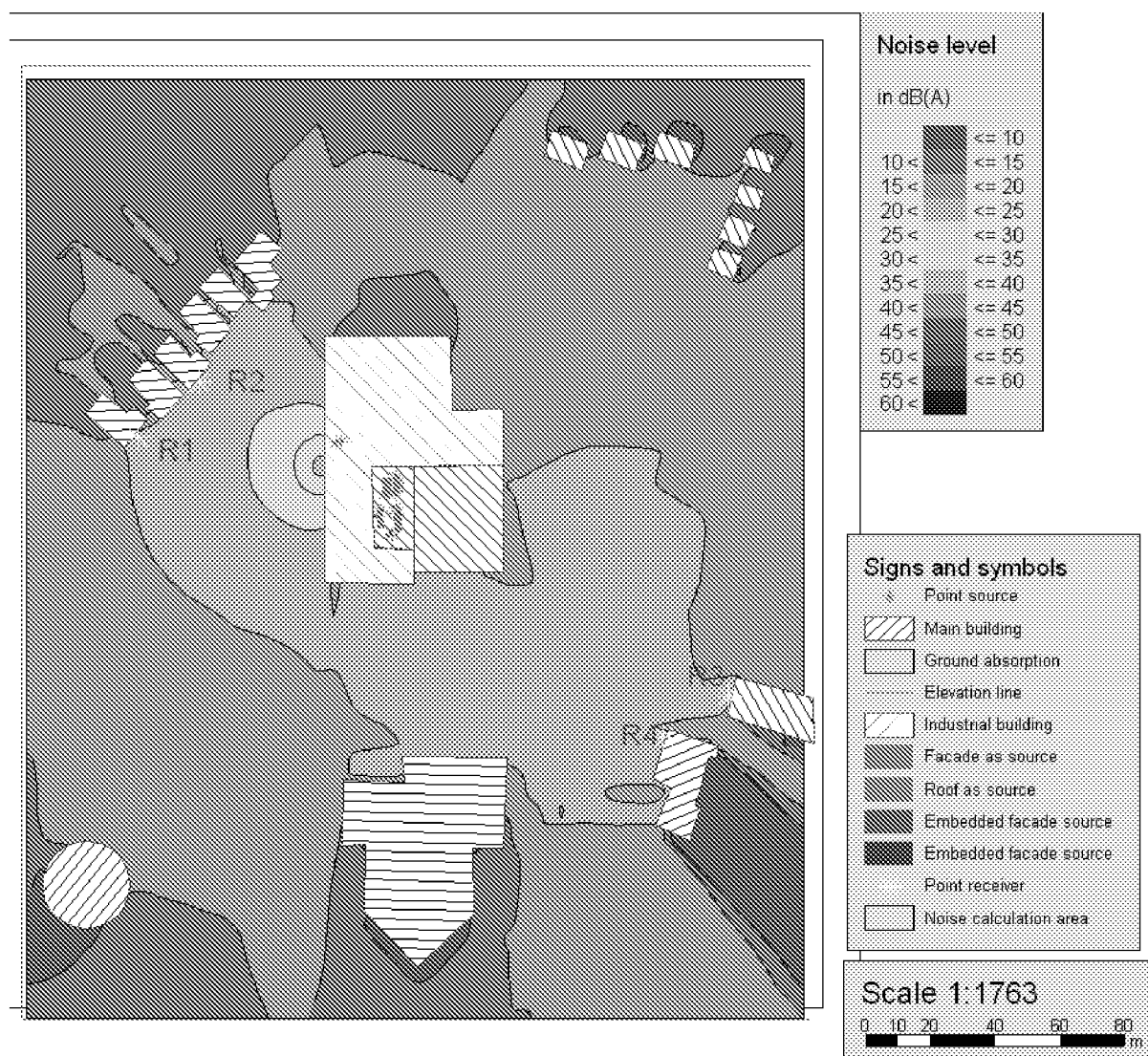
Unit	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz
Casing	20	17	27	33	39	44	49

4. Calculation summary

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

ID	Calculated Sound Pressure Level
R1	22
R2	23
R3 Ground Floor	20
R3 First Floor	21
R3 Second Floor	22
R4 Ground Floor	20
R4 First Floor	22
R4 Second Floor	23

The figure below shows the SoundPlan sound contour map of the assessment area.



The table below shows the assessment method recommended by BS4142:2014 *Method for rating and assessing industrial and commercial sound*. The calculated sound levels were corrected by 5 dB (2 dB tonality, 3 dB impulsivity) in accordance with BS4142:2014 requirements for tonal or intermittent plant.

ID	Calculated Sound Pressure Level	+5 tonal penalty as discussed in BS4142:2014	Lowest Background sound levels LA90 dB	Excess of rating over background level
R1	22	5	28	-1
R2	23			0
R3 Ground Floor	20			-3
R3 First Floor	21			-2
R3 Second Floor	22			-1
R4 Ground Floor	20			-3
R4 First Floor	22			-1
R4 Second Floor	23			0

As can be seen from the table above the rating level is below the lowest measured background sound level. Therefore, this is an indication that the specific sound levels have a low impact at nearest noise sensitive receptors, depending on the context.

The table below includes the noise levels propagation at receiver R2

Source	Source type	Lw dB(A)	K1 dB	KT dB	Ko dB	S m	Adiv dB	Agrr dB	Abar dB	Aatm dB	ADI dB	dLrefl dB	Ls dB(A)	dLw dB	Cmet dB	ZR dB	Lr dB(A)
AHU01 Breakout	Area	59.6	0	0	0	73.42	-48.3	0.3	-11.5	0	0	4	4.1	0	0	0	4.1
AHU01 Breakout	Area	54.3	0	0	3	74.31	-48.4	0.1	-14.4	0	0	3.6	-1.9	0	0	0	-1.9
AHU01 Breakout	Area	58.1	0	0	3	74.36	-48.4	0.1	-14.5	0	0	4.8	3	0	0	0	3
AHU01 Breakout	Area	58.1	0	0	3	72.37	-48.2	0.1	-12.5	0	0	3.2	3.7	0	0	0	3.7
AHU01 Breakout	Area	54.3	0	0	3	72.45	-48.2	0.1	-12.3	0	0	4	0.9	0	0	0	0.9
AHU01 Exhaust	Point	62.8	0	0	0	71.68	-48.1	0.5	-15.4	-0.1	0	4	3.7	0	0	0	3.7
AHU01 Fresh Air	Point	65.9	0	0	0	72.16	-48.2	0.3	-14.4	-0.1	0	4	7.5	0	0	0	7.5
AHU02 Breakout	Area	42.7	0	0	3	67.27	-47.5	0.1	-13	0	0	0	-14.8	0	0	0	-14.8
AHU02 Breakout	Area	48.5	0	0	3	67.58	-47.6	0.1	-13.3	0	0	2.3	-6.9	0	0	0	-6.9
AHU02 Breakout	Area	43	0	0	3	69.06	-47.8	0.1	-14.2	0	0	0	-15.9	0	0	0	-15.9
AHU02 Breakout	Area	48.4	0	0	3	68.72	-47.7	0.1	-14.1	0	0	3.9	-6.4	0	0	0	-6.4
AHU02 Breakout	Area	47.6	0	0	0	68.29	-47.7	0.3	-12	0	0	2.5	-9.4	0	0	0	-9.4
AHU02 Exhaust	Point	61.6	0	0	0	67.23	-47.5	1.1	-22.7	-1.6	0	3.9	-5.2	0	0	0	-5.2
AHU02 Fresh Air	Point	58.4	0	0	0	66.9	-47.5	0.5	-15.6	-0.1	0	4.1	-0.3	0	0	0	-0.3
AHU03 Breakout	Area	56.1	0	0	3	66.64	-47.5	0	-14.1	0	0	4.2	1.8	0	0	0	1.8
AHU03 Breakout	Area	57.7	0	0	0	65.61	-47.3	0.2	-11.8	0	0	2.4	1.2	0	0	0	1.2
AHU03 Breakout	Area	53.1	0	0	3	66.09	-47.4	0	-14.1	0	0	2.3	-3.1	0	0	0	-3.1
AHU03 Breakout	Area	56.1	0	0	3	64.46	-47.2	0	-13.3	0	0	2.4	1	0	0	0	1
AHU03 Breakout	Area	52.9	0	0	3	65.03	-47.3	0	-12.8	0	0	2.4	-1.8	0	0	0	-1.8
AHU03 Exhaust	Point	71	0	0	0	65.19	-47.3	-0.2	-18.3	-0.2	0	3.7	8.7	0	0	0	8.7
AHU03 Fresh Air	Point	67	0	0	0	66.46	-47.4	0	-16.9	-0.1	0	4.1	6.6	0	0	0	6.6
Boiler Flue Discharge	Point	58.1	0	0	0	50.58	-45.1	2.8	-2.9	0	0	2.5	15.4	0	0	0	15.4
CHP Flue Discharge	Point	58.3	0	0	0	52.05	-45.3	1.2	0	-2.2	0	2.4	14.3	0	0	0	14.3
First Floor Louvre 0.5 m2 1 m2	Area	46.9	0	0	3	44.84	-44	0.9	0	-0.2	0	2.4	8.9	0	0	0	8.9
First Floor Louvre 1m2 CHP	Area	48.8	0	0	3	45.2	-44.1	1.1	0	-0.4	0	2.4	10.7	0	0	0	10.7
Ground Louvre 0.2m2	Area	41.3	0	0	6	45.01	-44.1	-3.3	0	-0.1	0	2.3	2.2	0	0	0	2.2
Ground Louvre 0.2m2	Area	41.1	0	0	6	44.68	-44	-3.2	0	-0.1	0	0	-0.2	0	0	0	-0.2
Ground Louvre 5m2	Area	46	0	0	6	45.54	-44.2	-3	0	-0.1	0	2.3	7	0	0	0	7
Kitchen Extract Breakout	Area	62	0	0	3	72.73	-48.2	-0.1	-14	0	0	4	6.6	0	0	0	6.6
Kitchen Extract Breakout	Area	62.3	0	0	0	72.3	-48.2	0	-12.2	0	0	4	6	0	0	0	6
Kitchen Extract Breakout	Area	57	0	0	3	72.46	-48.2	-0.1	-14.2	0	0	3.7	1.1	0	0	0	1.1
Kitchen Extract Breakout	Area	62	0	0	3	72.07	-48.1	-0.1	-12.7	0	0	5.2	9.2	0	0	0	9.2
Kitchen Extract Breakout	Area	62	0	0	3	71.81	-48.1	-0.1	-12.8	0	0	3.4	7.3	0	0	0	7.3
Kitchen Induct Outlet	Point	64.9	0	0	0	73.3	-48.3	0.3	-12.6	0	0	3.6	7.8	0	0	0	7.8
Louvre Facade	Area	9.9	0	0	6	45.09	-44.1	-2.6	0	-0.1	0	0	-30.9	0	0	0	-30.9
Louvre Facade Mazanine Ground Floor	Area	52	0	0	3	45.32	-44.1	0.5	0	0	0	2.4	13.7	0	0	0	13.7
Pool Filtration Plant Room	Area	41.4	0	0	6	44.73	-44	-2.9	0	-0.1	0	2.3	2.7	0	0	0	2.7
PUHZ-RP71VHA	Point	55.4	0	0	3	69.66	-47.9	-1.8	-18	-0.1	0	4.1	-5.3	0	0	0	-5.3
PUHZ-ZRP35VKA	Point	53.4	0	0	3	69.74	-47.9	-1.8	-18	-0.1	0	4.1	-7.4	0	0	0	-7.4
PUHZ-ZRP35VKA	Point	53.4	0	0	3	69.53	-47.8	-1.8	-18.1	-0.1	0	4.1	-7.4	0	0	0	-7.4
PUHZ-ZRP35VKA(1)	Point	53.4	0	0	3	69.22	-47.8	-1.7	-18.1	-0.1	0	4.1	-7.4	0	0	0	-7.4
PUHZ-ZRP50VKA	Point	53.4	0	0	3	69.62	-47.8	-1.8	-18	-0.1	0	4.1	-7.3	0	0	0	-7.3
PUHZ-ZRP125VKA2 (1)	Point	59.4	0	0	3	67.62	-47.6	-1.7	-19.1	-0.1	0	4.2	-1.9	0	0	0	-1.9
PUHZ-ZRP125YKA2(2)	Point	59.4	0	0	3	68.08	-47.7	-1.7	-18.8	-0.1	0	4.2	-1.8	0	0	0	-1.8
PUHZ-ZRP140YKA2	Point	59.4	0	0	3	69.33	-47.8	-1.8	-18.5	-0.1	0	4.2	-1.6	0	0	0	-1.6
PUHZ-ZRP200YKA2(2)	Point	66.4	0	0	3	68.31	-47.7	-1.7	-18.8	-0.1	0	4.2	5.3	0	0	0	5.3
PUHZ-ZRP200YKA2(3)	Point	66.4	0	0	3	68.01	-47.6	-1.7	-19.1	-0.1	0	4.3	5.1	0	0	0	5.1
PUHZ-ZRP200YKA2(4)	Point	66.4	0	0	3	68.58	-47.7	-1.7	-18.7	-0.1	0	4.2	5.3	0	0	0	5.3
PUHZ-ZRP200YKA2(5)	Point	66.4	0	0	3	68.38	-47.7	-1.7	-18.9	-0.1	0	4.3	5.2	0	0	0	5.2
PUHZ-ZRP200YKA2(6)	Point	66.4	0	0	3	69.07	-47.8	-1.7	-18.2	-0.1	0	4.1	5.6	0	0	0	5.6
PUHZ-ZRP200YKA (1)	Point	66.4	0	0	3	67.86	-47.6	-1.7	-19.1	-0.1	0	4.3	5.1	0	0	0	5.1
LAeq dB																	23

The table below includes the legend

Legend

Source		Name of source
Source type		Type of source (point, line, area)
Lw	dB(A)	Sound power level per unit
KI	dB	Correction for source impulsiveness
KT	dB	Correction for source tonality
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
ADI	dB	Mean directivity correction
dLrefl	dB	Level increase due to reflections
Ls	dB(A)	Unassessed sound pressure level at receiver $L_s = L_{w_i} + K_o + ADI + A_{div} + A_{gr} + A_{bar} + A_{atm} + A_{fol_site_house} + A_{wind} + dL_{refl}$
dLw	dB	Correction due to source operation time
Cmet	dB	Meteorological correction
ZR	dB	Correction for rest periods
Lr	dB(A)	Assessed level of time slice

5. Conclusions and Discussion

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

In order to meet the acoustic criteria recommended by the relevant acoustic guidelines, significant noise control measures are necessary. Minimum transmission losses of attenuators, louvres and minimum sound reduction requirements of the acoustic enclosures, where necessary, are recommended within this report.

Should you wish to discuss the above further, please do not hesitate to contact the undersigned.

Yours sincerely,

For Pace Consult



Joan-Carles Blanco

Acoustic Consultant